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PSYCHOLOGICAL REVIEW PUBLICATIONS

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# Psychological Bulletin

EDITED BY

EDWARD S. ROBINSON, YALE UNIVERSITY

HOWARD C. WARREN, PRINCETON UNIVERSITY (*Review*)

SAMUEL W. FERNBERGER, UNIV. OF PENNSYLVANIA (*J. Exper. Psychol.*)

WALTER S. HUNTER, CLARK UNIVERSITY (*Index*)

HERBERT S. LANGFELD, PRINCETON UNIV. (*Monographs*)

WITH THE CO-OPERATION OF

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UNIVERSITY OF MINNESOTA

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# Publications of the American Psychological Association

EDITED BY

HOWARD C. WARREN, PRINCETON UNIVERSITY (*Review*)  
S. W. FERNBERGER, UNIVERSITY OF PENNSYLVANIA (*J. Exper. Psychol.*)  
WALTER S. HUNTER, CLARK UNIVERSITY (*Index and Abstracts*)  
HENRY T. MOORE, SKIDMORE COLLEGE (*J. Abn. and Soc. Psychol.*)  
HERBERT S. LANGFELD, PRINCETON UNIVERSITY (*Monographs*)  
EDWARD S. ROBINSON, YALE UNIVERSITY (*Bulletin*)

HERBERT S. LANGFELD, Business Editor

## PSYCHOLOGICAL REVIEW

containing original contributions only, appears bi-monthly, January, March, May, July, September, and November, the six numbers comprising a volume of about 540 pages.

## PSYCHOLOGICAL BULLETIN

containing critical reviews of books and articles, psychological news and notes, university notices, and announcements, appears monthly (10 numbers), the annual volume comprising about 720 pages. Special issues of the BULLETIN consist of general reviews of recent work in some department of psychology.

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containing original contributions of an experimental character, appears bi-monthly, February, April, June, August, October, and December, the six numbers comprising a volume of about 700 pages (from Jan. 1, 1932).

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is a compendious bibliography of books, monographs, and articles upon psychological and cognate topics that have appeared during the year. The INDEX is issued annually in June, and may be subscribed for in connection with the periodicals above, or purchased separately.

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*Abnormal and Social*: \$5.00 (Foreign, \$5.25). Single copies \$1.50.

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**PRINCETON, N. J.**

# THE PSYCHOLOGICAL BULLETIN

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PROCEEDINGS OF THE FORTIETH ANNUAL MEETING  
OF THE AMERICAN PSYCHOLOGICAL ASSOCI-  
ATION, INCORPORATED, ITHACA, NEW  
YORK, SEPTEMBER 8, 9, 10, 1932

REPORT OF THE SECRETARY, DONALD G. PATERSON,  
UNIVERSITY OF MINNESOTA

The American Psychological Association, Inc., held its fortieth Annual Meeting at Cornell University, Ithaca, New York, on Thursday, Friday, and Saturday, September 8, 9, and 10, 1932. A total of 612 persons registered, 121 of these being Members, 250 being Associate Members, 31 newly elected Associates, and 210 persons not affiliated with the Association. An analysis of the registration by geographical districts and states is as follows: West North Central States, 47 (Iowa 14, Kansas 1, Minnesota 22, Missouri 8, Nebraska 2); East North Central States, 140 (Illinois 48, Indiana 5, Michigan 31, Ohio 46, Wisconsin 10); West South Central States, 5 (Arkansas 2, Texas 2, Oklahoma 1); East South Central States, 11 (Kentucky 6, Tennessee 4, Mississippi 1); Mountain States, 3 (Utah 1, Idaho 1, Wyoming 1); Pacific States, 10 (California 10); South Atlantic States, 42 (District of Columbia 10, Georgia 3, Maryland 16, North Carolina 7, Virginia 3, Florida 3); Middle Atlantic States, 249 (New Jersey 16, New York 181, Pennsylvania 52); New England States, 100 (Connecticut 49, Massachusetts 39, Rhode Island 3, Vermont 1, Maine 4, New Hampshire 4); Canada, 5.

The program consisted of seventeen sessions in which 106 papers were presented by members and associates.

Provision was made for the business meeting of the Section on Clinical Psychology and two of the seventeen sessions were devoted to papers on Clinical Psychology.

On Friday afternoon a Round Table on Radio in Education was held.

On Thursday and Friday afternoons, the Department of Psychology of Cornell University was host at two delightful teas held in the Laboratory of Psychology, Morrill Hall.

On Friday evening, the Presidential Address, "Age and Human Ability," was given by Walter R. Miles.

Apparatus was exhibited by a number of Members and Associates in the Laboratory of Psychology, Morrill Hall.

A meeting of the Council of Directors was called at 2:35 o'clock on Wednesday afternoon, September 7, and was adjourned at 12:18 A.M. that night.

#### TRANSACTIONS OF THE ANNUAL BUSINESS MEETING

Due notice having been given, the annual business meeting of the American Psychological Association, Inc., a quorum being present, was held on September 8, 1932, in Room A, Goldwin Smith Hall, Cornell University, Ithaca, New York, at 8:09 P.M., with President Miles in the chair.

Upon motion duly made and seconded, it was voted that the minutes of the thirty-ninth annual meeting at the University of Toronto be approved as printed in the November, 1931, issue of the *PSYCHOLOGICAL BULLETIN*.

At the request of President Miles, Professor Bentley extended greetings from Dr. Livingston Farrand, President of Cornell University.

In commemoration of the fortieth anniversary of the American Psychological Association, Joseph Jastrow, one of the founders of the Association and its first Secretary-Treasurer, spoke briefly concerning the events leading up to the launching of the Association in 1892.

On motion of Dr. James McKeen Cattell, it was voted that the Association should send a Western Union cablegram to the Directors of the Laboratory of Psychology of the University of Leipzig commemorating the one hundredth anniversary of the birth of Wilhelm Wundt and congratulating members of the Leipzig Laboratory for carrying on so worthily the work of their great master.

The Secretary announced the vote by the Council of Directors, as authorized by the thirty-ninth annual business meeting of the American Psychological Association, Inc., held on September 10, 1931, at the University of Toronto, accepting the invitation from the Univer-



sity of Chicago to hold the forty-first Annual Meeting at the University of Chicago on September 7, 8, 9, 10, 11, 12, and 13, 1933, and appointing Harvey A. Carr as a member of the Executive Committee for 1932-1933.

The Secretary announced that the Council of Directors unanimously approved the resolution prepared by the Committee on Precautions in Animal Experimentation opposing the passage of Senate Bill 2146 dated December 6, 1931, and authorized the Chairman of the Committee on Precautions in Animal Experimentation to circularize the membership of Congress in opposition to the passage of this bill. See report of the Committee on Precautions in Animal Experimentation, page 615.

The Secretary announced the unanimous approval of the Council in appointing Herbert S. Langfeld as Vice-President of the Psychological Review Company.

The Secretary announced that the Council of Directors approved the action taken by the President and the Secretary in sending a message to be used in connection with the celebration on October 15, 1931, of Dr. Walter Bradford Cannon's twenty-five years as George Higginson Professor of Physiology in Harvard University. See copy of telegram and Professor Cannon's reply as printed on page 614.

The Secretary announced that the Council of Directors unanimously approved the action of the President in appointing John F. Dashiell of the University of North Carolina to act as the representative of the American Psychological Association at the inauguration of President Frank Porter Graham of the University of North Carolina which was held November 11, 1931.

The Secretary announced that the Council of Directors had approved reports of the financial status of the *Psychological Abstracts*, the Psychological Review Company, and the *Journal of Abnormal and Social Psychology* for 1931 as printed in the March issue of the PSYCHOLOGICAL BULLETIN.

The Secretary announced the newly elected officers of the Section on Clinical Psychology as follows: Chairman, Edgar A. Doll; Member of the Executive Committee for 1932-1935, Richard H. Paynter.

The Secretary announced the deaths of Jasper C. Barnes, on September 13, 1931; Frederick G. Bonser, on June 8, 1931; Mary L. Dougherty, on January 7, 1932; Franklin H. Giddings, on June 11, 1931; George H. Mead, on April 26, 1931; Edgar J. Swift, on August 30, 1932; Leonard Thompson Troland, on May 27, 1932.

The Secretary announced the resignations of the following Members: Margaret K. Bishop, Frank G. Bruner, Charles C. Josey, Anna J. McKeag, Prentice Reeves, William D. Tait. The Secretary announced the resignations of the following Associate Members: Myron C. Barlow, Sarah J. Basset, John Patterson Currie, Hasse O. Enwall, F. Rodney Gillespie, Cleon Johnson, Jacob C. Kelson, Katherine H. Read, Anna R. Shotwell. The Secretary announced the transfer of the following Members to Associateship: Helen Hubbert Caldwell and Florence Richardson Robinson.

On recommendation of the Council of Directors, it was voted to transfer the nineteen Associates named below to the status of Member:

- |                       |                           |
|-----------------------|---------------------------|
| 1. Charles W. Bray    | 11. Chauncey M. Louttit   |
| 2. Andrew W. Brown    | 12. Norman R. F. Maier    |
| 3. Psyche Cattell     | 13. Karl F. Muenzinger    |
| 4. Herbert S. Conrad  | 14. Norman L. Munn        |
| 5. Frank A. Geldard   | 15. Mary M. Shirley       |
| 6. Clarence H. Graham | 16. Frank K. Shuttleworth |
| 7. Edward B. Greene   | 17. Robert C. Tryon       |
| 8. Orvis C. Irwin     | 18. Dorothy Van Alstyne   |
| 9. Ernest M. Ligon    | 19. Joseph Yoshioka       |
| 10. Erich Lindemann   |                           |

On the recommendation of the Council of Directors it was voted to elect as associates the 193 persons whose names appear below:

- |                           |                            |
|---------------------------|----------------------------|
| 1. Mary E. Adams          | 22. Philippe S. DeQ. Cabot |
| 2. Cecelia G. Aldrich     | 23. Evelyn M. Carrington   |
| 3. Clinton McClarty Allen | 24. J. Edward Caster       |
| 4. Edward E. Anderson     | 25. Wilton P. Chase        |
| 5. Dorothy M. Andrew      | 26. Alice M. Christian     |
| 6. Evelyn Y. Atkinson     | 27. Grace Clark            |
| 7. Lawrence M. Baker      | 28. Catherine E. Conway    |
| 8. Elinor J. Barnes       | 29. Marion Frances Cowin   |
| 9. Dorothy M. Bassett     | 30. Charles M. Davidson    |
| 10. Albert Sidney Beckham | 31. Helen P. Davidson      |
| 11. R. O. Beckman         | 32. Claire C. Dimmick      |
| 12. Fred S. Beers         | 33. C. D. Donaldson        |
| 13. W. Ralph G. Bender    | 34. Mildred Day Dorcus     |
| 14. George K. Bennett     | 35. Mildred L. Dow         |
| 15. Paul Charles Bosse    | 36. Thelma Agnes Dreis     |
| 16. Henry Bowers          | 37. Jack W. Dunlap         |
| 17. Jessie Brainard       | 38. John Ruskin Dyer       |
| 18. Robert L. Brigden     | 39. Richard H. Earhart     |
| 19. Steuart H. Britt      | 40. John Carrol Eberhart   |
| 20. Elmer R. Burch        | 41. Anne Pilsk Edelman     |
| 21. Wendell R. Carlson    | 42. Edward E. Edelman      |

43. Minna Libman Emch
44. Milton H. Erickson
45. Paul J. Fay
46. Daniel D. Feder
47. Frank Herschel Finch
48. Glen Finch
49. Lois E. Fisher
50. Harriett Anderson Fjeld
51. John Porter Foley, Jr.
52. Marion Font
53. Margaret A. Forrest
54. Milton Forster
55. Edna J. Fox
56. Jerome D. Frank
57. Eva Allen Freeman
58. Donald D. Gaskill
59. Evelyn Gentry
60. Edward S. Girden
61. William D. Glenn, Jr.
62. Wendell L. Gray
63. Helen J. Green
64. Marion F. Greenham
65. Olive J. Grigsby
66. Stephen Habbe
67. Kenneth B. Hait
68. William M. Hales
69. Margaret E. Hall
70. James A. Hamilton
71. George W. Haney
72. Mary R. Harrower
73. George M. Haslerud
74. Elise Hatt
75. Max F. Hausmann
76. Gertrude A. Heering
77. Ernest H. Henrikson
78. Francis W. Hibler
79. Arnold H. Hilden
80. Josephine R. Hilgard
81. Benjamin F. Holland
82. John Horowitz
83. Clarence V. Hudgins
84. Dwight J. Ingle
85. Dortha W. Jensen
86. Jessie Lockhart Jarvis
87. Winifred B. Johnson
88. James Richard Jones
89. Viola M. Jones
90. Harry W. Karn, Jr.
91. Edward H. Kemp
92. Margaret Kennedy
93. Donald D. Kinsey
94. Samuel A. Kirk
95. Helen Kitzinger
96. James Knight
97. Meyer Koch
98. Isadore Krechevsky
99. Harriet Lange
100. M. C. Langhorne
101. George Lapidus
102. Richard C. Ledgerwood
103. Mary E. Leinbach
104. Charles C. Limburg
105. Forrest E. Linder
106. Donah B. Lithouer
107. Dorothy Loeb
108. Geraldine Longwell
109. Robert C. Lumpkin
110. Richard Madden
111. Jean Lilian Marquis
112. A. Leila Martin
113. Herman Wilkes Martin
114. Lewis C. Martin
115. Abraham H. Maslow
116. Selma Mathews
117. Frieda K. Merry
118. Warren C. Middleton
119. Mary B. Small Millard
120. Eleanor O. Miller
121. Neal E. Miller
122. Alma Milliken
123. Margaret E. Murray
124. Harrison Musgrave, Jr.
125. Abraham Myerson
126. Claude C. Neet
127. Chung-Fang Ni
128. Mabel F. Nichols
129. Olaf Morgan Norlie
130. J. Wallace Nygard
131. Maryalys S. Parker
132. W. E. Parker
133. Ruth E. Perl
134. Anna Polkowski
135. J. M. Porter, Jr.
136. Malcolm G. Preston
137. Esther T. Radachy
138. Margaret MacLeod Ratliff
139. Maria Richers-Ovsiankina
140. Bernard F. Riess

- |                            |                              |
|----------------------------|------------------------------|
| 141. J. L. Risk            | 168. Frances M. Strakosch    |
| 142. Roy Leo Roberts       | 169. Paul W. Terry           |
| 143. Robert J. Rock, Jr.   | 170. W. H. Thompson          |
| 144. Juda Louis Rosenstein | 171. Frederick C. Thorne     |
| 145. Saul Rosenzweig       | 172. Michael I. Tomilin      |
| 146. John W. H. Ross       | 173. Caroline McCann Tryon   |
| 147. Anne G. Rothman       | 174. Richard J. Van Tassel   |
| 148. Bessie B. Sargeant    | 175. Charles LeClaire Vaughn |
| 149. S. Stansfeld Sargent  | 176. George B. Vetter        |
| 150. Amber A. Schowers     | 177. Lewis B. Ward           |
| 151. Richard Sears         | 178. Evelyn M. Warnke        |
| 152. Helen S. Shacter      | 179. Neil D. Warren          |
| 153. Carroll L. Shartle    | 180. Katherine L. Washburn   |
| 154. Marjorie E. Shaw      | 181. Carl H. Wedell          |
| 155. Frederick C. Shepard  | 182. LaBerta A. Weiss        |
| 156. Simon S. Silverman    | 183. Leonard B. Wheat        |
| 157. Ruth Mazer Simon      | 184. David R. Wheeler        |
| 158. R. M. Simpson         | 185. Robert W. White         |
| 159. Madorah E. Smith      | 186. Stella Whiteside        |
| 160. Kenneth L. Smoke      | 187. Martin F. Wiederaenders |
| 161. Pauline K. Snedden    | 188. Carleton L. Wiggan      |
| 162. Ellis Spear, 3rd      | 189. Warren W. Wilcox        |
| 163. W. Douglas Spencer    | 190. D. P. Wilson            |
| 164. Frank N. Stanton      | 191. Charles N. Winslow      |
| 165. Janet Steinberg       | 192. C. Gilbert Wrenn        |
| 166. Arabella Sterrett     | 193. Min-Chi Young           |
| 167. Leland G. Stockdale   |                              |

The report of the Committee on the Election of Officers was then presented as follows:

President for 1932-1933: L. L. Thurstone, University of Chicago.

Directors for 1932-1935: Edward A. Bott, University of Toronto, and Henry E. Garrett, Columbia University.

Nominees for appointment to the Division of Anthropology and Psychology of the National Research Council: Walter S. Hunter, Clark University, and Herbert Woodrow, University of Illinois.

Representative on the Social Science Research Council: L. L. Thurstone, University of Chicago.

The report of the Committee on Precautions in Animal Experimentation as printed on page 615 was read and accepted with thanks.

On the recommendation of the Council of Directors, it was voted to elect Calvin P. Stone of Stanford University as a member of the Committee on Precautions in Animal Experimentation for the term 1932-1935.



The report of the Program Committee as printed on page 617 was read and approved.

On the recommendation of the Council of Directors, John E. Anderson of the University of Minnesota, Franklin Fearing of Northwestern University, and the Secretary were elected as the Program Committee for 1933.

On the unanimous recommendation of the Council of Directors, it was voted to reelect Harvey A. Carr of the University of Chicago and Walter F. Dearborn of Harvard University as representatives of the Association on the Council of the American Association for the Advancement of Science.

On motion duly made and seconded, it was voted by over two-thirds (without dissenting vote) of the members present that Section 2, Article VIII, of the by-laws be amended by adding the following sentence: In case a husband and wife both hold membership, one may elect to receive the *PSYCHOLOGICAL BULLETIN* instead of the abstract journal of the Association providing an additional payment of two dollars a year be made to the Treasurer when the annual subscription is paid.

On the recommendation of the Council of Directors, it was voted that the American Psychological Association, Inc., should apply for membership in the Inter-Society Color Council.

On recommendation of the Council of Directors it was voted to appoint Clarence E. Ferree of Johns Hopkins University, A. T. Poffenberger of Columbia University, and Forrest Lee Dimmick of Hobart College as delegates to the Inter-Society Color Council with Clarence E. Ferree as voting delegate and to request the voting delegate to submit an annual report to the Association.

The report of the Committee on Psychology of the National Advisory Council on Radio in Education as printed on page 619 was read.

On the recommendation of the Council of Directors, it was voted that the report be accepted with thanks and the Committee continued.

On motion of Professor Bingham, it was voted that the American Psychological Association record its appreciation of the services of the thirty members who gave addresses in the series of nation-wide broadcasts on psychology during the past year and that the Association thank the National Advisory Council on Radio in Education, particularly Dr. Robert A. Millikan, its president, and Mr. Levering



Tyson, its director, for having opened the way for our participation in this pioneer undertaking.

On motion of Professor Gesell, it was voted that the meeting express its appreciation of what the Committee on Psychology of the National Advisory Council on Radio in Education has accomplished and especially to thank Dr. Walter V. Bingham for the effective way in which he planned and executed the nation-wide broadcasting of psychology lectures during the past year.

On the recommendation of the Council of Directors, the following resolutions were adopted:

1. That the Report of the Committee and of the Conference on the Relation of the American Psychological Association to the Social Science Research Council be accepted with thanks and be ordered filed without present approval of the report in its entirety. See copy of report as printed on page 620.

2. That the present Committee on the Relation of the American Psychological Association to the Social Science Research Council be discharged with thanks and that a Committee on Research in the Social Sciences be established to consider ways and means of facilitating psychological research and to consider such matters as may be referred to it by the Social Science Research Council or by the Association and its members provided that the Committee shall have no power to obligate the Association on any such matters without approval by the Association through official channels. Membership on the Committee shall consist of the three representatives of the American Psychological Association on the Social Science Research Council, the President and the Secretary of the Association as *ex officio* members and two members to be appointed by the Council of Directors. One member is to be appointed for a two-year term, the other member to be appointed for a three-year term and at the expiration of these terms further appointments for three-year terms are to be made at appropriate times to complete the membership of the Committee. The chairman of the Committee shall be the senior representative on the Social Science Research Council.

3. That the Association express its confidence in the Social Science Research Council and its concurrence in the general program of the Social Science Research Council for stimulating research through: conferences and planning, grants-in-aid, scholarships and fellowships, projects, and publication.

4. That R. S. Woodworth be appointed as a member of the Committee on Research in the Social Sciences for the two-year term and that John E. Anderson be appointed a member for the three-year term.

The Secretary announced that the Treasurer's report in accordance with vote taken at the Annual Business Meeting at Toronto was audited, approved, and printed in the March issue of the *PSYCHOLOGICAL BULLETIN*.

The Treasurer presented the estimate of resources and the budget for 1932-1933 as printed on page 627. On the recommendation of the Council of Directors, the budget was adopted.

Upon motion duly made and seconded, it was voted that the Association express its appreciation to Professor Madison Bentley and the Department of Psychology, and to President Livingston Farrand and the other administrative officers of Cornell University for the hospitable arrangements for the entertainment of the Association at its fortieth annual meeting.

The meeting adjourned at 9:36 P.M.

CANNON CELEBRATION

*Copy of Western Union Telegram*

Minneapolis, Minn., October 13, 1931.

Dr. Henry A. Christian,  
Chairman, Cannon Celebration,  
Harvard Medical School,  
Boston, Mass.

Psychologists the world around admire Walter Bradford Cannon and desire to do him honor. He has explored man where man thought himself inscrutable; he has set in array the delicate mechanisms of the feelings, reintroducing us to ourselves. How William James would have delighted in Cannon's work!

Professor Cannon, upon this occasion, we wish to record our gratitude for your contributions to science. You have honored us by membership in our Society, by contributions to our books and journals, by counsel in research, and by friendship. The texts and treatises of psychology will long contain your name, and our classrooms will re-echo with the recounting of your discoveries.

AMERICAN PSYCHOLOGICAL ASSOCIATION.

*Copy of Professor Cannon's Reply*

October 17, 1931.

Professor Donald G. Paterson,  
Secretary, The American Psychological Ass'n,  
University of Minnesota,  
Minneapolis, Minn.

DEAR PROFESSOR PATERSON: I was very glad indeed to receive this morning from Dr. Christian your letter disclosing the source of the message from the American Psychological Association that was read at the dinner Thursday evening. Nothing that was said that evening pleased me more than that message. I suppose one finds especial satisfaction in being recognized outside one's professional field. Certainly the thought that psychologists have high esteem for the values of my work for psychology is a source of keen pleasure. I wish that you would convey to anyone else who may have been responsible for the telegram my warmest feelings of gratitude.

Yours sincerely,

WALTER B. CANNON.

REPORT OF THE COMMITTEE ON PRECAUTIONS IN ANIMAL  
EXPERIMENTATION

August 15, 1932.

*To the Council of Directors and the Members of the American Psychological Association:*

GENTLEMEN: Through the courtesy of Dr. William C. Woodward, Director of the Bureau of Legal Medicine and Legislation of the American Medical Association, your committee has been informed during the past year of attempts by the legislatures of various states and by the Congress of the United States to pass bills which would seriously interfere with scientific research upon the living animal.

Your committee has done two things with respect to this information:

1. A memorial, copy of which follows, was sent to all members of Congress, protesting against the passage of Senate Bill 2146. This memorial was approved by all members of the Council of the American Psychological Association.

January 22, 1932.

Memorial to the Members of Congress,  
Washington, D. C.

HONORABLE SIR: "As Chairman of the Committee on Precautions in Animal Experimentation of the American Psychological Association, Incorporated in the District of Columbia, I wish to call your attention to the following resolution of the Council of Directors of the American Psychological Association relative to S. Bill 2146:

"The Council of the American Psychological Association wishes to voice its protest against the passage of Senate Bill 2146, dated December 17, 1931, which reads in part '. . . That from and after the passage of this Act it shall be a misdemeanor for any person to experiment or operate in any manner whatsoever upon any living dog, for any purpose other than the healing or curing of said dog, in the District of Columbia.'

"The American Psychological Association is in accord with other scientific and medical bodies in its judgment that animal experimentation has been of inestimable value to mankind.

"It believes that the advancement not only of medical practice but also of education and social procedure is greatly indebted to animal experiments. Many of our most fundamental notions concerning learning which are now affecting educational procedure throughout the country have been drawn from observations, humanely conducted and carefully safeguarded, upon the behavior of animals

in the experimental psychological laboratories of this and other countries."

Respectfully yours,

W. T. HERON,

Department of Psychology,  
University of Minnesota,  
Minneapolis, Minn.

2. Through the coöperation of the Secretary we were able to enclose, along with other material sent to all members of the Association, a letter bringing to the attention of the members these attempts by various legislative bodies to restrict research. A copy of this letter follows:

February 12, 1932.

*To Members of the American Psychological Association:*

"There has been introduced in the Senate of the Congress of the United States, Senate Bill 2146, dated December 17, 1931, which reads as follows:

1. Be it enacted by the Senate and House of Representatives
2. of the United States of America in Congress assembled,
3. That from and after the passage of this Act it shall be a
4. misdemeanor for any person to experiment or operate in any
5. manner whatsoever upon any living dog, for any purpose
6. other than the healing or curing of said dog, in the District
7. of Columbia.
8. Sec. 2. That any person convicted of a violation of
9. this Act shall be sentenced to pay a fine of not less than
10. \$100 nor more than \$500, or to undergo imprisonment for
11. a term of not less than three months nor more than one year,
12. or both such fine and imprisonment.
13. Sec. 3. That all Acts or parts of Acts inconsistent
14. herewith are hereby repealed."

"This bill is most drastic since it is leveled against *all* experimentation, not only operative work. Should the organizations backing the bill be successful in Congress, their efforts to force similar bills through the various state legislatures would be greatly facilitated.

"A similar bill, H-261, has been introduced in the legislature of New York State, and another bill, S-132, was introduced in the legislature of Massachusetts on January 18, 1932. Efforts toward legislation of this sort are on the increase and are backed by powerful organizations. These attempts at making laws to restrict scientific investigation should be combatted by every member of the A.P.A. On the other hand, these attempts to make laws to restrict scientific investigation should be a further warning to every person who conducts or directs experiments upon animals. Every precaution must



be taken in the conduct of experiments to see that there can be no possible justification for the arguments used in support of these restrictive measures.

"It is hoped that each member of the A.P.A. will voice his protest against the passage of the bill before Congress by writing to his respective Senators and Representatives. Similar action should be taken with reference to state legislators by those members living in states where bills of this nature are under consideration."

Sincerely yours,

C. J. WARDEN

E. G. WEVER

W. T. HERON, Chairman of Committee on  
Precautions in Animal Experimentation

So far as our information goes at the present, none of the proposed bills has been made a law. It is expected that bills of this nature will be much more numerous during 1933 than they were in 1932 as the legislatures of most states were not in session during 1932.

Respectfully submitted,

C. J. WARDEN

E. G. WEVER

W. T. HERON, *Chairman*

#### REPORT OF THE PROGRAM COMMITTEE OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, 1932

August 16, 1932.

*To the Council of the American Psychological Association:*

GENTLEMEN: In outlining its policies for the Ithaca program, the Program Committee discarded the division of papers in A, B, and C classes as used for the Toronto program, and requested each contributor to submit abstracts of either 300 or 150 words for a 15 minute or 10 minute report respectively, in accordance with his judgment as to whether or not it was a major or a minor report. In case the contributor wished, he could submit abstracts of both lengths, in which case the Program Committee would choose between them. In placing papers on the program, no distinction was made between the shorter and longer papers.

The Committee also adopted the policy of printing all abstracts. After making a quantitative study of the length of abstracts submitted in previous years, it reduced the length of the abstract for the

15 minute paper to 300 words and set the length of the abstract for the 10 minute report at 150 words. The Committee also set the date for the submission of abstracts two weeks earlier than the meeting of the Committee in order that the Secretary might correspond with contributors guilty of technical violations of the rules, so that they might modify or change their abstracts before the meeting of the Committee. In general the whole policy of the Committee was that of coöperation with contributors, upon the principle that the program of the Association is not a competition for place, but exists primarily for the purpose of presenting the results of investigations under way or completed. Nor does the Committee feel that the adoption of this principle resulted in any sacrifice in the quality of the papers appearing on the program. In arranging the program great care was exercised in the time placement of the sections of the program in order to reduce to a minimum conflicts among papers in closely related fields. Since a large proportion of graduate students are now Associates, and since graduate students have the opportunity of becoming Associates by the third year of their graduate work, the Committee discontinued the graduate students' programs and did not provide an opportunity for graduate students who are not Associates to submit papers.

The Thursday and Friday afternoon clinical programs were arranged by a Committee from the Clinical Section working in close coöperation with the Program Committee of the Association and were subject to the same regulations as the remainder of the program.

Of the 127 papers submitted, 118 were accepted. The large proportion of acceptances is to be explained largely in terms of the correspondence between the Secretary and the contributors, which resulted in the clearing of a large number of irregularities and technical deficiencies in advance. Of the 127 papers submitted, 65 were 15 minute papers only, 46 were 10 minute papers only, while 16 persons submitted abstracts of both lengths.

The Committee would like to call the attention of the Association to the fact that with the addition of some 250 members and associates each year, the pressure for space on the program is increasing; and to suggest that the Association consider in the near future the possibility of increasing the length of the annual meeting from three to four days.

ARTHUR G. BILLS  
DONALD G. PATERSON  
JOHN E. ANDERSON, *Chairman*

REPORT OF THE COMMITTEE ON PSYCHOLOGY OF THE NATIONAL  
ADVISORY COUNCIL ON RADIO IN EDUCATION

August 19, 1932.

*To the Council of Directors and the Members of the American  
Psychological Association:*

GENTLEMEN: The several aims of your committee as defined a year ago were published in the volume of the Proceedings of the First Annual Assembly of the National Advisory Council on Radio in Education, pages 234-241.

These aims have in part been realized. We have compiled a set of suggestions on "The Preparation of a Radio Address," to be published in the Proceedings of the Third Annual Institute on Education by Radio, held last June, at the Ohio State University. Through the National Advisory Council, some publicity has been secured for addresses on psychology broadcast by members of the Association from universities and other local stations. Several small conferences have been held and voluminous correspondence has been carried on with members who have had practical problems of broadcasting or who have been interested in the possibilities of research on related problems. A round table on the broadcasting of psychology has been arranged for the afternoon of Friday, September 9, 1932.

The chief accomplishment of the year, however, has been the broadcasting over a nation-wide network of a series of thirty addresses by members of the Association.

This pioneer venture in furnishing to a national audience the opportunity to hear about psychology from authoritative sources, met with an amazing public response. The speakers presented their several topics interestingly, informingly, and concisely. Members of the Association helped to bring the addresses to public attention. Through the National Advisory Council, the assistance of the public libraries and other agencies was enlisted. Discussion groups were formed. Supplementary visual aids and suggested readings were supplied in a series of six Listener's Notebooks, of which upwards of 45,000 copies were distributed. Of printed copies of the addresses, the distribution was 64,685.<sup>1</sup>

<sup>1</sup> A more detailed description of this undertaking is given in a report of the Chairman of the Committee, presented at the Second Annual Assembly of the National Advisory Council on Radio in Education, May 19, 1932, to be published in the Proceedings under the title, "An Experiment in Broadcasting Psychology."

The thirty addresses and the introductory chapters to each of the six units of the series, together with the other supplementary materials, have now been published in book form under the title "Psychology Today."<sup>2</sup> They furnish general readers with an exceptionally compact and interesting glimpse of what psychologists are doing.

As a consequence of this undertaking, a great many Americans have had their first introduction to the kind of psychology which it is the purpose of this Association to advance.

The Committee has not been definitely informed as to the immediate plans of the National Advisory Council with reference to nation-wide broadcasting of psychology this coming year. We have been told that the Advisory Council is keenly appreciative of what this Association has done, and that it is their intention to sponsor more such national broadcasts when conditions warrant. The Director, Mr. Levering Tyson, asks for a continuance of the coöperation of the American Psychological Association in furthering the usefulness of radio as an adjunct to adult education.

PAUL S. ACHILLES

ARTHUR I. GATES

WALTER V. BINGHAM, *Chairman*

REPORT OF THE COMMITTEE AND OF THE CONFERENCE ON THE  
RELATION OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION  
TO THE SOCIAL SCIENCE RESEARCH COUNCIL

August 10, 1932.

*To the Council of Directors and the Members of the American Psychological Association:*

GENTLEMEN: The Committee on the Relation of the American Psychological Association to the Social Science Research Council met in the Council Room of Hart House, University of Toronto, on September 11, 1931. There were present Messrs. Allport, Brigham, Dunlap, Paterson, Woodworth, Yerkes, and Anderson, as chairman. After discussing the relation of the two organizations and suggesting several procedures for surveying the research activities of psychologists in the social sciences, the committee laid plans for a conference to be held in the spring of 1932 in order to discuss the relationship in more detail. The make-up of the Conference was left to a com-

<sup>2</sup> Published by the University of Chicago Press, 1932, pp. 495. \$1.60 postpaid.



mittee consisting of the chairman of this committee and the Secretary of the Association.

The Conference was held at the Princeton Inn, Princeton, N. J., on Sunday, April 24, 1932. There were present Messrs. Brigham, Dunlap, Fernberger, May, Moore, Murphy, Peterson, Robinson, Thurstone, Woodworth, and Anderson, as chairman. All had either served as representatives of the Association on the Social Science Research Council, or had been closely identified with the administration of the Association. Several others who were invited were unable to attend, including the Secretary of the Association, Mr. Paterson. However, the chairman of the conference discussed the work of the Conference in detail with the Secretary both before and after the meeting.

The opening discussion centered on the desirability of establishing a closer relationship between the American Psychological Association and the Social Science Research Council and of setting up a device for fostering research in the social sciences within the discipline of psychology. The point was made that as a result of the tradition of rotating offices in the Association, the representatives of the Association on the Social Science Research Council were constantly changing and that they went out of office at about the time they were familiar with the work of the Council. This was contrasted with the procedure in some of the other constituent societies, which have maintained the same representation over a long period of time and thus achieved continuity of relationship. It was also pointed out that the participation of the Association in the Social Science Research Council covers only a part of the psychological interests in research since psychology is closely related to the physical and biological sciences and is, therefore, also affiliated with the National Research Council. In this respect, likewise, the Association differs from other constituent societies. The point was also made that the Association in its selection of representatives on the Social Science Research Council, has in the main selected its representatives from those of its members interested in Social Psychology, even though the entire field of psychology bears some relationship to the work of the Social Science Research Council, and even though requests are often made of psychologists whose interests lie outside of the social sciences for work relating to the social sciences.

Further, it was stated that the American Psychological Association has always had as its primary interest the advancement of psychology as a science, and the promotion of research. Moreover, the requirement for Membership in the society, which is the publi-



cation of research beyond the doctorate dissertation, results in an organization composed almost entirely of those who have made definite contributions to the science in the form of research. In this respect also, the Association differs from other constituent societies of the Social Science Research Council, among the members of which there are many for whom research is not an interest. The question was raised, therefore, whether the function of this Conference in so far as it concerns the American Psychological Association was similar to that of the conferences and committee meetings held by other constituent societies, under the vote of the Social Science Research Council bringing the conference into existence.

The discussion then centered upon methods for the development within the Association of a mechanism that would insure a progressive and continuing relation between the American Psychological Association and the Social Science Research Council. As a result, the following votes were carried:

*Voted*, that the Conference recommend to the American Psychological Association, the creation of a standing committee of fifteen members to be known as the Committee on Research in the Social Sciences, the Committee to consist of ten elected members, the three representatives of the Association on the Social Science Research Council *ex officio*, the President of the Association *ex officio*, and the Secretary of the Association *ex officio*. Upon the adoption of this action, the Council of Directors of the Association shall be empowered to appoint two members for one year terms, two members for two year terms, two for three year terms, two for four year terms and two for five year terms and to designate one of the appointees as chairman of the Committee. Each year thereafter, the Council of Directors of the Association shall be empowered to appoint two members for five year terms to take the places of those members of the committee whose terms expire that year and to designate a chairman. The Committee may make nominations to the Council of Directors for appointment to the Committee, but only the Council of Directors shall have the power of appointment. In selecting members of the Committee, the Council of Directors may make reappointments if it so desires, and in case of a vacancy in the personnel of the Committee arising from any cause, the Council of Directors shall be empowered to fill the vacancy for the unexpired term.

It shall be the purpose of this Committee to advise the Council of Directors of the Association and the Association itself on all matters pertaining to the facilitation of research in the social sciences and on all matters pertaining to the affiliation of the Association with the Social Science Research Council and to consider such matters and undertake such duties as may be referred to it by the Council of Directors or by the Association. Further

the Committee may consider such matters as are referred to it by the Social Science Research Council, except that the Committee shall have no power to obligate the Association on any such matter, without approval by the Association through official channels. Further the Committee may suggest to the Council of the Association the names of candidates for representatives of the Association on the Social Science Research Council, it being understood, however, that the right of nomination inheres in the Council of Directors as provided in Section 2, Article VI of the By-Laws of the Association.

*Voted*, to recommend to the Association, through the Council of Directors, that the Association suggest that the Social Science Research Council make the necessary financial provisions for an annual meeting of the standing Committee on Research in the Social Sciences, preferably at a time other than that of the regular meeting of the Association, in order that it may give due consideration to the matters that come before it, without the distractions incident to the general meeting of the Association.

In the discussion of these votes, the statement of the objective of the Social Science Research Council, listed under Roman numerals I to VII were read. It was suggested that they might be regarded as defining the functions of the Committee on Research in the Social Sciences of the American Psychological Association, in so far as these objectives are appropriate to the tie-up of psychology with other social sciences and with the Social Science Research Council. It was also suggested that the Committee in addition to its other functions, might profitably interest itself in the attempt to standardize the tools which psychology offers to other social sciences, perhaps even publishing a memorandum or pamphlet describing the various scales, rating devices, measurement techniques, etc., useful in the study of personality and social relations. It was also suggested that the committee undertake several of the surveys of research in the social sciences done by psychologists, as suggested at the Toronto meeting. It was clear from the discussion that it was the sense of the Conference that the proposed committee should not engage in the seeking of funds for research, or attempt to set up additional machinery for the facilitation of research, that would compete with the Social Science Research Council. But it was felt that if the Committee were strongly interested in a particular project or program for fostering research within the field of psychology, it might appropriately request the Social Science Research Council to assist it in securing funds for such a project or program. It was also the sense of the Conference that the representatives of the Association on the

Social Science Research Council should be looked upon as the liaison officers between the Committee of the Association and the Social Science Research Council. It was also suggested that the Committee might select sub-committees either from its own membership or from the Association as a whole, to consider any specific problems which might be referred to the Committee either by the Association or by the Social Science Research Council.

As a further device for securing integration with the Social Science Research Council, the Conference

*Voted*, to suggest to the Social Science Research Council the desirability of providing an opportunity for closer contact between the Secretary of the Association and the officers of the Social Science Research Council, in order to integrate more effectively the work of the Association and the Council.

The Conference then discussed the possibility of participating in a plan for centralizing the offices of the constituent societies under the auspices of the Social Science Research Council. In the discussion it was pointed out that because of the increase in the business of the American Psychological Association, the setting up of a permanent business organization in a central office has been recognized by the Association as a problem. At the present time the Association has four offices: a Secretary's office in Minneapolis, a Treasurer's office in Providence, the offices of the Psychological Review Company, a subsidiary of the Association, in Princeton, N. J., and the offices of the Psychological Abstracts in Worcester, Mass. Against centralization the point has been raised that under the present arrangements, the Association receives a large portion of its services free; in favor of centralization is the gain in efficiency and continuity of policy that would result from combining activities so widely scattered. It was also pointed out that the Association is a participant not only in the Social Science Research Council but also in the National Research Council, a connection which the Association is desirous of maintaining, because many of the research activities carried on by psychologists are closely related to the biological and physical sciences. But the point was also made that if any joint plan of central offices can be worked out, several of the Association's enterprises, if not all, might be fitted into such an organization with advantage both to the Association and the Social Science Research Council.

It was then

*Voted*, that it is the sense of the Conference that, while realizing the advantages to be gained from a central office for the American

Psychological Association, maintained in conjunction with other scientific societies under the auspices of the Social Science Research Council, it does not see its way clear at the present time to recommend that the Association participate in any such arrangement, unless financial support of a substantial amount be made available; and that the Social Science Research Council be requested to advise the American Psychological Association of any prospective developments looking toward the centralization of the offices of the constituent societies.

The question of the publication of the results of investigations in the social sciences was then raised. There was some feeling on the part of those present that financial support is frequently more readily obtained for the conduct of a research project than for the publication of the results when the project is completed. The existence of a pronounced lag between the completion of research and the publication of results, due to the congestion of all journals in the psychological field, was commented upon. It was then

*Voted*, that it is the sense of the Conference that the attention of the Social Science Research Council be called to the desirability of serving research by increasing the facilities for publication.

It was suggested that the Council might be asked to consider the desirability of issuing a series of monographs, pamphlets, etc., to provide an additional avenue within this field and that occasional surveys of work in progress, with brief statements of the character of the work under way might be of considerable value to the worker in social science. This last need, though met in part by conferences, is particularly great in such a rapidly moving field.

There was some discussion whether the Association itself might not, as the owner of the *Journal of Abnormal and Social Psychology*, assist in facilitating the publication of social studies, particularly in view of the fact that the *Journal* has a small surplus. It was the sense of the Conference that the Editor of the *Journal* be requested to make the necessary informal approaches to the Council of Directors of the Association, looking toward an enlargement of the *Journal*, and that the Conference place itself on record as favoring such enlargement.

Mr. Woodworth as referee of the Social Science Abstracts, then asked the Conference for an informal expression of opinion as to the value of Social Science Abstracts to psychologists. It was the feeling of the Conference that the Abstracts are of relatively little value, so far as psychologists are concerned. In the discussion the point was made that a possible explanation of their limited usefulness



could be found in the existence within the psychological field of an abstract journal, operated by the Association. It was suggested that an interdisciplinary journal in social science carrying original articles and reviews of an expository and critical nature, might be of greater value to psychologists.

The Conference then discussed further possibilities of the stimulation of research within the psychological field. It was the feeling of the Conference that it could not intelligently consider questions of surveys, projects, and programs of research, but that, if the mechanism, *i.e.*, the permanent committee which it was recommending, came into existence, such questions could be considered more effectively and at greater leisure by the permanent than by an ephemeral group. It was

*Voted*, to make the minutes of the Toronto committee meeting and the proceedings and suggestions of this conference available to the new committee, when and if constituted, for such use as it deems advisable.

*Voted*, to express its confidence in the Social Science Research Council and its concurrence in the general program of the Council in stimulating research through: conferences and planning, grants-in-aid, scholarships and fellowships, projects, and publication.

It was suggested that questions arising as to the possible modification of the program of the Social Science Research Council in so far as they affect the stimulation of research in the psychological field, might appropriately be referred to the new Committee on Research in the Social Sciences of the American Psychological Association, when and if constituted, and that the way be left open for this Committee to make suggestions to the Social Science Research Council on desirable methods of facilitating research within the field of psychology.

JOHN E. ANDERSON, *Chairman*



AMERICAN PSYCHOLOGICAL ASSOCIATION, INCORPORATED

Budget Proposals, Fiscal Year, 1933

|  |             |
|--|-------------|
| Printing and Supplies .....                    | \$700.00    |
| Postage and Express.....                       | 700.00      |
| Telephone and Telegraph.....                   | 25.00       |
| Reprints*.....                                 | 500.00      |
| Yearbooks.....                                 | 750.00      |
| Treasurer's Bond and Safety Deposit Box.....   | 50.00       |
| Committee on Animal Experimentation.....       | 25.00       |
| Secretary's Stipend .....                      | 1,500.00    |
| Treasurer's Stipend .....                      | 300.00      |
| Incidentals Annual Meeting.....                | 300.00      |
| Subscriptions to Psychological Abstracts.....  | 5,200.00    |
| Exchange and Revenue Tax on Checks.....        | 15.00       |
| Apparatus Exhibit .....                        | 50.00       |
| Membership in Inter-Society Color Council..... | 25.00       |
|  | <hr/>       |
|  | \$10,140.00 |
|  | <hr/>       |
| Estimated Income .....                         | \$11,000.00 |
|  | <hr/>       |

\* Including Proceedings of the Annual Meeting.

## ABSTRACTS OF PAPERS

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### PROGRAM: GENERAL

THURSDAY, SEPTEMBER 8, 9:30 A.M.

ROOM B, GOLDWIN SMITH HALL

WALTER R. MILES, *Chairman*

*Determining Tendencies: Their Nature and Function.* LOUIS B. HOISINGTON, University of Oklahoma.

If we assume that mind is nothing over and above the responses, both sensory and motor, of the organism, and, further, that these responses do reveal orderliness, it follows that determination must be a form of response since energy is itself non-directive. A determining tendency then is nothing other than a state of tension in the muscular system. Determining tendencies thereby become capable of both direct and indirect observation, and, as such, objects of direct scientific study.

The facts about determination have been obscured by the apparent diversity of its manifestations and by the multiplicity of words which have been used to designate it. Real gain would come from the adoption and general use of some one term.

Although determination is always the same thing, viz., a set of the muscular system, there is some ground for the use of such different terms as will, desire, wish, purpose, aims, ideals, task set, and attention. These differ in their reference to and influence on further responses rather than in their fundamental psychological character. To give a specific name to the determination in every different situation leads to confusion.

The determining tendency, like any other response, is conditioned by external stimulation and by the response state of the organism. Organization affects and is affected by the determining tendencies. This means that determination affects and is affected by all our responses. We develop in an integrated way.

Whether the determining tendencies themselves are integrated into a hierarchical system, is an important problem. [15 min.]

*"Insight" as an Explanatory Concept in Psychology.* JOSEPH PETERSON, George Peabody College.

The history of the use of "insight" and of equivalent terms is traced and the sort of situations in which insight has been reported are examined. The objective records of considerable numbers of college students and of some children in such learning processes as the Atkinson problem (to arrange into 24 combinations the 16 letters presented in a square), the Rational Learning problem, the Disc Transfer problem, and the Mental Maze, display the successive situations presented to the several subjects and their responses to each situation in the order of occurrence. These records reveal a relatively small per cent of cases in which insight might be said to occur. Each case of this sort is carefully analyzed as to its developmental background and the possibility of its prediction from previous responses. The analyses of these data occurred after the experiments in learning had been carried through, and before there was any thought on the part of the experimenter as to such use of the data; hence no unconscious factors could have been operative toward influencing the subjects by any attitude of expectation in the experimenter. In later experiments the processes of solving these problems were directly observed, without an awareness of this fact by the subjects, and each subject was asked, after the solution, to write down the difficulties that were encountered and how he overcame them. In addition, definite questions were asked by the experimenter after the completion of learning processes which seemed to involve insight. The results leave very little justification for the use of "insight" as an explanatory category in learning. [15 min.]

*Sign-Gestalt or Conditioned Reflex?* EDWARD CHACE TOLMAN, University of California.

A variety of simple discrimination-box experiments with different relations between the initial cue-stimuli (white and black curtains) and the respective ultimate results of food and electric shock and also between such initial cue-stimuli and further white and black curtains (placed on the way to the food and the shock) have been tried out. Interesting differences in the difficulties of learning the initial curtains in these different types of set-up have been found. Such differences can no doubt be explained in conditioned response terms (provided one take certain liberties with the latter) but they can also and perhaps with greater ease and intelligibility be explained in "sign-gestalt" terms. [15 min.]

*An Appraisal of the Experimental Evidence for Regarding Pavlovian Reflexology as an Explanatory Principle of Behavior.* ROGER BROWN LOUCKS, Phipps Clinic, Johns Hopkins Hospital.

Pavlov has affirmed that such diverse phenomena as sleep, hysteria, and pattern discrimination may be explained in terms of waves of excitation and inhibition which "irradiate" from various "centers" in the cortex. Data from the original papers on tactile irradiation which Pavlov cites in his book "Conditioned Reflexes" were tabulated and statistically summarized. It appears from these data that stimulation of points on a dog's skin in the vicinity of a spot given an inhibitory stimulus (*i.e.*, at one and two units of distance) results in small salivary secretions representing an inhibition of approximately 75 per cent. All points at greater distances (*i.e.*, three up to the maximum of nine units) register an inhibition of approximately 30 per cent. In the Kogan study which Pavlov cites, the regression of the secretions for these remote points, as found in one dog, is .2 per cent per unit distance, for the second dog, .5 per cent, and for a third dog, .1 per cent. Probable errors of the regressions are 4.2, 3.5, 5.5 per cent, respectively. Krasnogorsky's study similarly fails to demonstrate a successive decrement of the inhibition with distance. Tables from Krep's study, published in Pavlov's book, give clearcut evidence for the equivalence of the "inhibition" at all remote points. Similar studies of the so-called "irradiation of inhibition" carried out in the Conditioned Reflex Laboratory at Phipps Clinic confirm the data of the Russian experiments as opposed to Pavlov's interpretations of these data. Considered together, these investigations strongly suggest that Pavlov's "explanation" of behavior in terms of his specific mechanisms of "irradiation" and "concentration" calls for more critical interpretation, with greater attention to what is structurally differentiated in the cerebral cortex. [15 min.]

*Concerning the Anthropocentrism of Psychology.* ROBERT M. YERKES, Yale University.

From its beginnings, Psychology has been anthropocentric. Man has supplied its materials, mainly, and also its standard of reference. Perhaps this should continue. Today it appears that Psychology is attempting to be all things to all men. The term is so vague and inclusive in popular usage as to be valueless. In the mouths of pro-

fessionals, its meaning depends on the interests and prejudices of the individual. Where ideally there should be agreement and coöperation, there exist instead conflicting schools and cults. Principles are in dispute.

To simplify and clarify the situation, and also to promote constructivity, it is proposed that two fields of interest and activity be recognized and thus defined: Psychology, the systematic study, by introspection and any other fruitful methods, of the conscious self and the relations of selves; and Psychobiology, the objective study of the behavior of the organism as a whole, whether or not conscious and self-conscious. Psychology, as thus defined and delimited, obviously would be dominantly anthropocentric, subjective—a social and philosophical discipline; whereas Psychobiology instead would be biocentric, objective—a natural science.

A practical situation confronts us, response to which we cannot avoid. Either we may affirm the possibility of serviceable knowledge of the self as conscious object or we may deny it. In the first instance we naturally should resolve to continue and cultivate what stands historically as the science of Psychology. And in the second, we should sanction and further its assimilation by the general science of biology. The latter is precisely what certain American behaviorists are doing.

The practical solution of the devastating conflict of schools and points of view which I have suggested may seem too naïve and simple to be taken seriously. Truth often is like that. [15 min.]

*Recent Trends in German Psychology.* GOODWIN WATSON,  
Columbia University.

The writer of this report wrote to a score of the more promising assistants and instructors (now all below the rank of professor) requesting their selection of the five or ten most significant experimental enterprises of the last decade in German Psychology. Emphasis was laid, in the request, upon new methods, significant findings, originality, quantitative results.

The paper reports the studies chosen by these young psychologists as of outstanding merit in the recent history of German psychology; further analysis is made of the type of problem, type of approach, etc., which may be characteristic of the present and immediate future in German psychology. Comparison is made with American procedures. [10 min.]



## PROGRAM: PERSONALITY AND CHARACTER

THURSDAY, SEPTEMBER 8, 10:00 A.M.

ROOM A, GOLDWIN SMITH HALL

LEONARD CARMICHAEL, *Chairman*

*Configurational Tendencies in Rorschach Responses.* SAMUEL J. BECK, Boston Psychopathic Hospital.

In administering the Rorschach personality test (an ink-blot series) to healthy adults of very superior intelligence, the subjects were frequently observed to be organizing details of each ink-blot figure into larger, meaningful wholes. The 2,215 responses obtained from the 39 subjects in the experiment were therefore examined for evidence of this configurational activity and they yielded quantitative findings making possible some tentative conclusions on this organizing process. Thus, these organized combinations were found to fall into fairly clear-cut groups. The combination may consist of (a) adjacent details; (b) distant details, separated either by white space or by solid portions; (c) white spaces combined with adjacent solid portions; (d) portions of the figure were broken up, and the elements so obtained recombined into meaningful percepts, an analysis-synthesis process; (e) the figure was reacted to as a whole.

Sigma difficulty values were computed for each of these organization processes, in the series as a whole, and in each figure in the series. The statistical method used is illustrated.

Since significant variations occurred in the sigma values of the same organizing process in the different test figures, one conclusion is that difficulty of an organizing process is a function not only of the kind of organization achieved, but also of the configuration presented.

Conclusion from the series as a whole: the order of difficulty of achieving an organization of form (from least to most difficult) is: wholes; combining adjacent details; combining black with white details; combining distant details; analysis-synthesis process. Not all the differences are statistically significant. Uncontrolled variables in the experiment were: rôle of color and of ordinal position of figures in effecting organizing acts. [15 min.]

*The Validation of the Personality Inventory.* ROBERT G. BERNREUTER, Pennsylvania State College.

In constructing the Personality Inventory, each item was validated against criterion groups selected by means of Thurstone's, Allport's,

Laird's, and Bernreuter's tests. Following the construction, comparisons were made with ratings and with scores on the above-mentioned tests.

In the further validation, it was found by comparing the sigmas of single scores with the sigmas of total distributions that the scores obtained could not be interpreted as due to chance alone. Two additional studies were made to determine whether the scores were invalidated by desire on the part of the subjects to possess the characteristics which they ascribed to themselves, or by desire to gain social approval. The results show that these factors operate to so small an extent, if at all, that they do not invalidate the Personality Inventory scores. Additional information concerning the imbrication of neurotic tendency and introversion was also obtained. [10 min.]

*The Measurement of Inferiority Feelings at the High School Level.*

RANDOLPH B. SMITH, Columbia University.

This study reports the development of a self-rating personality test for the measurement of inferiority feelings at the high school level. Reliability  $+.95$  ( $N=411$ ). Validity evidence from comparisons of normal and Juvenile Court cases revealed D/S.D.'s of 4.95, 2.41, 5.33, and 4.52 in the direction of higher mean inferiority scores for Juvenile Court cases. Forty per cent of a total group of 132 Juvenile Court cases obtained scores above the diagnostic level of "extreme inferiority" (1 S.D. above mean of normal population). Correlations with teachers' ratings,  $+.37$  to  $+.47$ . Correlations with C.A. slightly positive, those with M.A., I.Q., School Achievement and Socio-Economic status slightly negative.

Previous to the development of the final form of the test two preliminary forms were developed, one composed entirely of positive items (Form P), one entirely of negative items (Form N). (By positive and negative items is meant the positive and negative statement of the same test element.) Each negative item was paired with a corresponding positive item, the underlying inferiority element remaining the same. To allow for study of the forms and items unbiased by any particular order of administration, the two forms were administered in all possible sequences—PN, NP, PP, NN—to between 1000–1100 cases. Analysis of the responses to the two forms revealed highly significant differences in the kind of response elicited by the two types of items. The positive items were found to be the more valid and reliable measuring elements on practically every count. Inasmuch as most of our present measures of neurotic tendencies, introversion-extroversion and the like are composed pre-

dominantly of items of the negative type, this study suggests the desirability of serious reconsideration of the form of test elements best suited to personality tests of the self-rating variety. [15 min.]

*An Analysis of Certain Alleged Introverted Interests.* ROSS STAGNER, University of Wisconsin.

Introversion has been variously defined in terms of interests and behavior. The present study attempts to determine those interests which are consistent enough to be characterized as "introverted." Fifty-five items from the questions of Laird, Freyd and Heidebreder, and Neymann and Kohlstedt, and fifteen items from Conklin's list, were administered to 171 college men. Extreme groups (15 per cent of distribution) were selected and each item studied for differential value.

The results show clearly that many alleged introverted interests, *e.g.*, in daydreams, or in keeping a diary, do not distinguish the two groups. The items which have high diagnostic values are those relating to social behavior (quiet amusements, intellectual as opposed to athletic games, working alone). These results have an important bearing on definitions of introversion. [10 min.]

*Introversion-Extroversion: Fact or Fiction.* J. P. GUILFORD and RUTH B. GUILFORD, University of Nebraska.

A typical test containing 36 representative items usually supposed to be diagnostic of introversion-extroversion was given to 930 students. Each item was correlated with every other one, the coefficients ranging between  $-.41$  and  $+.39$ . A *g*-factor was assumed and the correlation of each item with "*g*" was found, none being higher than  $.51$ . Seven items long supposed to be diagnostic correlated zero with "*g*." All other items correlated negatively or positively with "*g*" as would be expected from armchair speculations. The correlation of the best weighted pool of items with "*g*" was  $.87$ .

Specific correlations, with "*g*" held constant, were computed. The mean of these was  $.137$ , which was 6.2 times the maximum P.E. The test therefore contains group factors. Thurstone's method of factor analysis revealed at least 18 such factors. The four most important may be described as follows: (1) a tendency to shrink away from the environment; (2) emotional responsiveness; (3) impulsiveness; (4) egocentricity. Factors (1), (2), and (4) have much in common with the assumed *g*-factor. Various writers have apparently identified introversion-extroversion with one of

these four factors; (1) Jung; (2) Marston; (3) McDougall; and (4) Freud.

Some general conclusions follow: (1) Introversion-extroversion, in the sense of a single general dimension of personality represented in every item of the typical test, is a fiction; (2) Personality is an extremely multidimensional affair; (3) there is enough coherence between a few allied dimensions such as those represented in a typical test of introversion-extroversion, to make an appearance of a major variable of personality; (4) As in intelligence testing, an introvert-extrovert score should never be given apart from the name of the test from which it was obtained. [15 min.]

*Relation of Several Factors, Including Friendship, to Cheating.*

A. M. JORDAN, University of North Carolina.

The I.E.R. double-testing technique was used in grades IV, V, VI, and VII to obtain an accurate measure of the cheating propensities of children when the opportunities for cheating were made easy. The population, consisting of 276 pupils, was selected from two schools widely differing in the cultural and economic background of their constituencies. In order to get some notion of the stability of the cheating function the tests were repeated at an interval of one year. During this interval diverse types of possible causes of cheating were investigated. Censuses of friends were taken at three month intervals; investigator visited classes and playgrounds to rate the behavior of children; ratings of coöperativeness were secured from the teacher of the more formal subjects and from the playground teacher; Sims' test of socio-economic level was given; the occupations of parents were secured; and scores made on the Stanford Achievement Tests were recorded.

The amount of cheating while large did not differ substantially from that of the study of May and Hartshorne. Friends' cheating scores showed a present but low correlation with individual scores provided the censuses and tests were had close together in time. There were substantial changes in cheating during the period of a year. Out of 276 cases, 75 were found who changed over entirely from cheating to not cheating or *vice versa*. The fact that the reliability of the I.E.R. technique when tests were administered the second time after a period of a year was only  $+.48$  also indicates that important changes took place in cheating. (The reliability of these tests when given close together in time is about  $+.75$ .) There was present but low correlation between cheating scores and the Stanford Achievement scores or measures of intelligence. [15 min.]



*Neuroticism in Marriage.* RAYMOND ROYCE WILLOUGHBY, Clark University.

The Thurstone Personality Schedule was sent to about 150 couples, with directions including a device for estimating the reactions of the spouse. All subjects were from the superior economic and educational groups. The women, as usual, are more neurotic than the men, and both are more neurotic than presumably comparable groups of college students; this difference is rather strongly localized in specific items. There is homogeneity in neuroticism comparable in size with that for physical characters. "Insight," in the sense of ability to estimate neuroticism in the spouse correctly, is associated with neuroticism in the category of social-attitudes items, but not in the others; there is no significant association with sex and no considerable homogeneity in this ability. "Projection," in the sense of a tendency to ascribe neuroticism to the spouse incorrectly ("correctly" and "incorrectly" meaning only in agreement or disagreement with the spouse's own estimate), is also associated with neuroticism, and in some categories of items there is a tendency for the women to be more susceptible to this tendency; there is a small homogeneity in this measure. The amount of difference is greatly underestimated by both husband and wife, but this may be partly a function of the notation scheme used. There are considerable differences in the behavior of individual items and categories of items, including a range of incidence percentages from less than 1 to over 75; the various items are associated very slightly in excess of chance. [15 min.]

*The Relation of Certain Social Attitudes of College Students to Other Factors.* RENSIS LIKERT, New York University.

The present study, a part of a larger investigation being conducted by Gardner Murphy and Rensis Likert, deals not with vague, hypothetical traits, such as "radicalism" or "liberalism," but with three attitude "clusters" which have been empirically determined by data from eight different universities. These three attitude "clusters" are: attitude toward internationalism, Negro, and imperialism. These attitudes were measured by scales constructed from the *Survey of Opinions* prepared in connection with the larger investigation previously mentioned. The attitude "clusters" are fairly independent, the average intercorrelation being about  $+.40$ .

One characteristic previously reported as differentiating "radi-



cals" and "conservatives" is majority opinion. The test of susceptibility to majority opinion used here consisted of a retest of part of the *Survey of Opinions* with the experimenter telling the subject the reaction of the majority on each statement. Using statements having to do with internationalism, it was found that the most internationally minded appeared to be somewhat more influenced by the opinion of the majority than the most nationalistic. This relation was obtained when the majority shift was corrected for "chance" shifts. The opposite relationship, ordinarily found, was obtained until this was done.

In studying the relationship of internationalism to information on international questions, a slight tendency was noted for those most internationalistic and those most nationalistic to be somewhat better informed than those who fell toward neither extreme.

Among college students practically no relationship was found between the social attitudes studied and intelligence scores, sex, age, size of home community, family income, etc. Rather striking relationships were found between attitudes and such factors as parent's political affiliation, geographical location, and membership in or contact with various social groups. [15 min.]

PROGRAM: WORK AND EFFICIENCY

THURSDAY, SEPTEMBER 8, 10:30 A.M.

ROOM C, GOLDWIN SMITH HALL

CALVIN P. STONE, *Chairman*

*Further Studies of "Warming-up" in a Perceptual-Motor Task.*

E. B. SKAGGS, College of the City of Detroit.

This work is an extension of the work already reported. The task consisted in replacing the blocks of a Goddard formboard from certain spatial positions. Ten trials, one-half minute between each trial, were taken each day after two successive practice days. Three groups of college men were used as subjects, 15 men in each group. Group I replaced blocks from a fixed position corresponding to recesses in the formboard; Group II replaced blocks from a fixed but reversed position; and Group III replaced blocks from a random arrangement. The task was easiest for Group I, harder for Group II, and most difficult for Group III.

Using the Robinson-Heron formula for eliminating learning and comparing (1) first and last five trials and (2) first and last two trials, WU was found in all groups. No clear relationship was found between the degree of complexity of the task and the amount of WU.

In a second experiment three subjects were highly trained on the formboard. WU was found to be about the same as for the little-practiced groups above mentioned. Neither a brief arm-finger exercise nor a brief perceptual study and mental rehearsal of the "set-up" resulted in any difference in WU.

Study of protocols indicates that WU is a term which may include a number of factors. Certain factors make for WU: (1) a preceding attitude which must be shifted; (2) an emotional state at first, later passing away; (3) reaction to failure or poor work by added effort; (4) "back-stroke" tonic effect of exercise and tension; (5) a trial-and-error process of getting back to previous "form." Certain other factors prohibit the appearance of WU. [15 min.]

*The Intent to Work: Conscious Acceptance of Driving Stimulation During Repetitive Mental Work.* DOUGLAS FRYER, New York University.

In a situation where a stimulus becomes effective as a drive upon mental activity an essential factor is the awareness of that stimulus' relationship to the intent to work. (The intent to work was defined for experimentation as a conscious motive, or intentional awareness, which can be described at least partially by the observer.) Sensory stimulation does not directly affect the working accomplishment unless it is accepted into the working situation. Motivation in mental activity is conditioned upon the acceptance of driving stimulation.

This conclusion comes as a by-product of several experiments performed in the investigation of the intent to work and evidence for it is found in both subjective and objective results. These experiments have been concerned with motivation of the speed factor in mental work. Accuracy was controlled through the use of very simple materials composed of additional tests with sums totaling not more than nine. Various verbal and concrete changes were introduced into the working situation. Their effects were measured in increases and decreases in accomplishment. These were related to the descriptions of the awareness of the observers taken before and after work. There is both positive and negative evidence for the conclusion stated above. In no situation, where new verbal instructions or sensory stimulation such as rhythms of various rates and

patterns and noises were introduced, was there a change in the accomplishment unless the stimulation was accepted into the working situation. There is awareness, of course, of the changes, and extraneous speculation concerning them, but acceptance of the drive is necessary, and the building of an intent to work in relation to it, before there is other than a chance effect in accomplishment. [15 min.]

*The Effect of Knowledge of Results on Muscular Work.* CHARLES W. MANZER, New York University.

Sixty-eight men and forty-six women college students, each sex divided equally into control and experimental groups, made fifty maximal contractions on the Smedley hand dynamometer at intervals of fifteen seconds. All the contractions made by the control groups were made without knowledge of results. In the case of the experimental groups the first ten contractions were made without knowledge of results; after each of the next twenty contractions the subject was told by the experimenter how much work he had done; the last twenty contractions were made without knowledge of results. These final twenty contractions comprise work done after knowledge of results had been suddenly withdrawn. Results: (1) Merely informing the subject that he is to be told how much work he does causes a sudden upward turn in the curve of muscular work. (2) The curve of the experimental group rises rapidly to a point 10 per cent above the control level, continues upward to a maximum level of 12 per cent above the control and then gradually declines to a level 8 per cent above the control. (3) When knowledge of results is suddenly withdrawn, there is no abrupt fall in the work curve. The preceding motivation seems to have an after-effect which holds the curve 8 per cent above the control level throughout the rest of the experimental series. (4) There are great individual differences. Knowledge of results causes an increase in the work of subjects who are at or near the mean of the group; that is to say, subjects who, while doing their best, still have a considerable reserve of energy. Motivation seems wasteful of energy among the powerful workers and futile among the weak workers. [15 min.]

*Causal Factors in Mental Blocking.* ARTHUR G. BILLS, University of Chicago.

By means of a new apparatus permitting the automatic recording of continuous vocal and manual responses, with temporal precision, it has been possible to verify previous results on mental blocking, and

to add new ones. A further analysis of the causal factors has brought out the following facts:

I. The frequency and length of enforced pauses in continuous mental work vary directly with the number of competing elements in the task.

II. If the conflict between elements is slight, due to the possibility of grouping the material into larger units, then there is an inverse relation between number of elements and blocking.

III. Externally imposed work rhythms reduce blocking by facilitating organization.

IV. Mental fatigue is a loss of control, rather than a breakdown of specific elements. The weakening of the controlling set allows conflict between the elements. [10 min.]

*The Maintenance of Bodily Efficiency.* HERMAN J. P. SCHUBERT, University of Buffalo.

An investigation was made of the change in the cost of muscular work as the time spent working at a constant rate against a constant load was increased. The excess oxygen consumption and heart rate were taken as indices of cost. The changes in the oxygen metabolism and heart rate were determined during and after work periods of various lengths, the maximum being twenty-two minutes.

Upon the initiation of work, there was a period of rapid acceleration of oxygen intake and heart rate. The heart rate continued to rise steadily, though slightly, throughout the entire time spent at work. After the first few minutes of work, the rate of oxygen intake remained practically constant for the remainder of the time spent at work. The greatest part of the oxygen debt to be discharged upon the cessation of work, was incurred in the first two minutes of work. With the rate of oxygen intake remaining at a level during the work and no increase in debt as the work period was lengthened, the cost ratio of kilogram-meters to cubic centimeters of oxygen and, therefore, the thermal efficiency, remain constant.

A quantitative formulation of the time course of oxygen intake and heart rate during recovery was derived. The recovery was found to be divided into two phases, the first of which proceeds rapidly, and the second slowly. The magnitude of the oxygen debt and the excess heart rate recovered slowly increases markedly with longer time spent at work. This increase in the magnitude of the prolonged phase of recovery is taken as the best index of greater tax on the organism, the longer it is performing work at a given efficiency. [15 min.]



## PROGRAM: SENSORY PHENOMENA

THURSDAY, SEPTEMBER 8, 1:30 P.M.

ROOM B, GOLDWIN SMITH HALL

MADISON BENTLEY, *Chairman*

*Stroboscopy Without a Flashing Light.* MILTON METFESSEL, University of Southern California.

The principle of stroboscopy has been used in psychological laboratories for two general purposes: determination of speed of rotation and measurement of pitch from the voice and other sources. All of these devices require a flashing light. When the light flashes synchronize with equally spaced holes, slits or delineations passing a given point per second, the holes, slits or delineations come into view. In our laboratory, Mr. Wichart found that a jarring of the head would give a momentary impression of the spokes in a revolving wheel. This suggested that a series of vibrations impressed on the eye through bone conduction would give the phenomenon of stroboscopy; and such proved to be the case. Tuning forks and electrical vibrators held against the head give the best results. Under certain conditions it has been possible to get stroboscopic effects directly from the observer's voice. The vibrations from the larynx are transmitted to the eye, shaking it, and thus yielding stroboscopy directly.

The explanation offered is that the eye in motion does not see distinctly, so that the eye sees the delineations on a stroboscopic disc or drum only at the two extremes of a sine-curve vibration, when the vibrator comes to a full stop. The precise nature of the impressed eye vibration may be seen on eye-movement photographs. Numerous applications of this method of obtaining stroboscopy or periodic "blinding" of the eyes by a controlled, impressed force will be mentioned. These experiments also suggest a possible explanation of observations reported in the literature in which revolving wheels of automobiles and propellers of airplanes were perceived as apparently standing still. The jarring from walking, motions of the jaw in talking, or vibrations set up by an airplane motor all could produce intermittent vision. Under certain conditions, the pulsing of blood in and about the eye can produce the same effects. [15 min.]



*Changes in Visual Acuity of One Eye Through Simultaneous Stimulation of the Other Eye or of Other Sense Organs.* GEORGE W. HARTMANN, Pennsylvania State College.

Kravkov maintains that an improvement in the visual acuity of the right eye in discriminating black figures on a white ground occurs if the left eye is simultaneously strongly illuminated, but that a deterioration occurs with white objects on a black field. Precisely similar results are alleged to have been obtained with a tone of 2,100 vibrations. In a check and extension of Kravkov's work, involving both the method of limits and the method of constant stimuli, it was found that the spatial thresholds of the right eye were slightly but consistently lower when the left retina was locally illuminated, but that the differences appeared regardless of the figure-ground organization, *i.e.*, whether black on white, white on black, or intermediate shades of grey were used. When tones of 2,100 or 180 vibrations were substituted for the light affecting the left eye and simultaneously actuated during the individual response periods, similar differences independent of the nature of the fields were exhibited. Motivated by Hornbostel's doctrine of the "unity of the senses" and Werner's evidence of experimentally-induced synaesthesias, the writer tested other olfactory and cutaneous stimuli for their "substitute value." Pleasant odors (citronellol) and unpleasant (xylanol) enhanced the temporary acuity in all figure-ground combinations to a less pronounced but nevertheless uniform degree. Even touch and pain stimuli applied to the hand were influential in the same direction. It seems that the separate sense organs do not function in complete isolation; either a reciprocal exchange of "neural energy" occurs or activity over a larger receptor range affects the responses made by a narrower portion thereof. [15 min.]

*A New Type of Test for Color Vision.* ELSIE MURRAY, Cornell University.

The Stilling, Ishihara and Nagel tests, though designed to detect a stereotyped deficiency (R-G blindness), in actual practice turn up a variety of definitely patterned responses. To all but the routine tester, these variants, along with the notable rarity of the "protanope" or R-blind of Helmholtzian tradition, urgently demonstrate the need for recasting the categories of color aberration. Both theoretical and practical interests point toward some new mode of charting variant color systems, whereby efficiency quotients for critical hues may be calculated and a profile plotted, for "normal," sub- or super-normal O's.

Descriptive difficulties inherent in the techniques of color-match-

ing, equations, hue discrimination, the determining of thresholds, and zone limits, render preliminary learning or naming tests imperative, with instruction in the use of standard color-circle terms and in the distinction of hue, brightness and saturation. To this end, a standardized set-up has been devised, a "campimeter" or hood lined with white blotting-paper and artificially illuminated, permitting 2" exposures of 1-in. disks, at 15 inches. Six series made up of 10 hues (four samples of each, of high, low and medium chroma, and of varying brightness, have been selected from the Munsell papers) and of five neutrals are presented, twice before and twice after instruction. An 8" interval between exposures allows for description by the *O* in the conventional terminology of the color-circle and the B-W continuum. "Instruction" involves the simultaneous exposure of two circles of ten samples each, with their standard designations, for study. With naming fairly stabilized, error patterns may be used to sort out divergent types for study with spectroscopic light at various wave-length settings. Sodium and mercury arc sources, with special filters loaned by H. P. Gage, are used for testing beyond the usually designated limits of vision in the "ultra-violet" and the "infra-red." [15 min.]

*Peripheral Form Discrimination Under Dark Adaptation.* CARROLL A. WHITMER, University of Pittsburgh.

Six forms (triangle, diamond, square, rectangle, and hexagon), each 10 square centimeters in area and having brightness of 244 millilamberts were exposed in paired combinations, one to each eye, at a distance of 60 centimeters. The exposure time for each pair of forms was .3 second. Three subjects made 10,140 responses to the forms. The decrease in accuracy of discrimination and the extent of the field for form discrimination was in the order in which the forms are named above. The results showed a more or less gradual decrease in accuracy with extension toward the periphery depending upon the particular form exposed. Discrimination was most accurate and the extent of the field greatest on the horizontal meridian and in the lower half of the visual field. The accuracy of discrimination was not perceptibly increased in that portion of the field which was covered by both eyes. [10 min.]

*Conditioned Responses to Barely Perceptible Visual Stimuli.* ROBERT R. SEARS and SIDNEY M. NEWHALL, Yale University.

Conditioned responses based on finger retraction to electric shock have been established to a light stimulus of an intensity of .003 photon in two subjects whose absolute thresholds, as determined by verbal

report methods, lie between .001 and .002 photon. Efforts are being made to establish conditioned responses to stimuli just at and just below the absolute threshold in order to determine the relationship between limens derived by verbal report methods and by the conditioned response technique. Apparatus problems (control of extraneous cues) and problems of procedure (criteria of conditioning) will be discussed. [10 min.]

PROGRAM: ANIMAL PSYCHOLOGY

THURSDAY, SEPTEMBER 8, 2:15 P.M.

ROOM A, GOLDWIN SMITH HALL

ROBERT M. YERKES, *Chairman*

*Animal Behavior Film Demonstration for Elementary Instruction.*

WILLARD L. VALENTINE, Ohio State University.

The film is taken from a reel entitled "The Measurement of the Hunger Drive by Means of the Obstruction Method." It shows groups of rats running a modified Warden obstruction apparatus after several different periods of starvation. [10 min.]

*Relationship of Drive to Learning.* M. H. ELLIOTT, Harvard University.

Rats were trained in a five-way multiple-choice apparatus. All choices were rewarded in the same manner. With weak hunger the performance of each rat was quite variable and there was little tendency toward stereotypy even after seventy trials. The hunger was then increased and each rat tended to select a particular path and to stick to it on successive trials. A return to weak hunger did not change the performance.

A second group of rats, very hungry during the early training, immediately showed a stereotyped performance which persisted through successive decreases in hunger.

The results indicate that strong hunger may have a "stamping-in" effect and that this effect is irreversible in nature. [10 min.]

*A Further Study of the Effect of the Variation of Reward and Drive upon Maze Performance in the White Rat.* ROBERT HALL BRUCE, Ohio State University.

Evidence for 100 days with 30 animals supplementing and extending the work of Tolman, Elliott, and the writer bearing on the above

problem will be presented. A 14 unit Multiple-T maze in which combination curtains and doors prevented retracing was employed. Indirect lighting, shifting of the maze, and other precautions were taken to keep experimental conditions constant.

Group A was run once a day for 50 days for water as a reward with a 24 hour thirst drive. Group B was run once a day for 50 days for food (softened biscuit) as a reward. Group B exhibited superior performance as judged by the criteria of time and errors.

After 50 trials on the maze, performance becomes fairly standardized and the effect of varying reward and drive can better be observed than the use of only a few trials as has been done by previous investigators. On days 51-60 the rewards were shifted, drives being constant, and with this incongruity of reward and drive both groups exhibited a decrement in performance. On days 61-70 the drives being now congruent with the rewards, better performances ensued. When a reward (bread swimming in milk) was used on days 71-85 which satisfied both drives, and the drive shifted every five days in both groups, there was a slight breakdown in performance on the first days of the change.

Theoretical importance of the relation of (1) Drive, (2) Pre-current Learning Movements, (3) Reward, studied under conditions which permit a critical examination of the theory that (1) and (2) are highly specific with respect to (3) is discussed, and the reliability of the maze under these varying conditions found. [15 min.]

*The Effect of Delayed Reward upon Learning in the White Rat.*

JOHN B. WOLFE, University of Illinois.

The object of this investigation was to determine how the effectiveness of reward in bringing about learning is affected by delaying the reward, that is, by inserting an interval of time between the rewarded act and the reward itself. The study employed two situations, which were alike in that each permitted the rat to choose between two courses of action, but which were quite different as regards the "cue" which the rat must follow if he were ever to learn always to choose the rewarded act. One situation was a single-T maze, and the other was a black-white discrimination-box. Delays of 0, 5, and 30 seconds, and of 1, 2½, 5, 10, and 20 minutes were used. In the case of both situations it was found that as the reward was delayed, it decreased in effectiveness with extreme rapidity. [10 min.]



*Motivation and Efficiency in Ant Learning.* T. C. SCHNEIRLA, New York University.

Because of the diversified and complicated relationship that exists between nutrition and individual behavior in the ant by virtue of highly specialized social activities, the "drive" factor cannot be approached as in the vertebrates. A set-up that involves the learning of an objectively identical maze problem under two very different conditions has been devised to overcome this difficulty. The results suggest the possibility of a more direct approach to the problem.

A standard maze problem was presented to *Formica* ants under the following conditions: (A) the maze was learned in the course of successive trips (unladen) from the nest to a food-place; and (B) in the course of trips (laden) from food-place to the nest. The "B" ants learned the pattern more efficiently, and in fewer trips than were required by the "A" ants. Ants of the "B" group also eliminated the important blind alleys in a more efficient manner. There were other significant differences in general behavior and in economy of learning under the two conditions.

When ants were made to pass through the two "running situations" on each trip, adjustment was very difficult. The less capable ants stopped running after a few trips, and in the best cases efficiency was attained in but one phase (practically always the "B" condition) after a highly variable course of learning. The interference was not as evident when the pattern was originally mastered in one situation before being presented in the other. This not only approaches the general problem from the "completeness of organization" aspect, but also gives certain leads toward understanding the function of the nervous tissues in insect learning.

The facts indicate the existence of important differences in the organic conditions upon which learning is based in the two "running situations." [15 min.]

*Goal Direction Orientation and Goal Gradient as Factors in Maze Learning.* FLOYD L. RUCH, University of Illinois.

The principle of goal direction orientation as described by Dashiell and the hypothesis of goal gradient as outlined by Hull may be jointly invoked to explain the difficulty offered by the various blinds of multiple-T mazes.

The maze records of 139 white rats of four different strains learning under the motivating conditions of hunger or escape-from-water to run three patterns of multiple-T mazes demonstrate the validity of these two principles.

When the blind alleys of the mazes are designated as "goalward"



or "non-goalward" accordingly as they open toward or away from the goal and the number of entries into the blinds of the goalward class are plotted by trial as percentages of the total number of errors made on each trial, it is seen that the relative number of errors made in the goalward alleys increases during the early stages of learning and then declines as learning becomes more complete. This fact is not explained by the traditional kinaesthetic-pattern formula.

When the non-goalward blind alleys are arranged in the order of their nearness to the goal and the total number of entries into them are plotted as percentages of all errors, it is seen that there is a marked tendency for those blinds nearest the goal to be entered less frequently than those more remote. This relationship is implied in the hypothesis of goal gradient.

Slides will be exhibited showing the exact patterns of the mazes employed and presenting in graphic form the quantitative data from which the above conclusions are drawn. [15 min.]

*The Susceptibility of Rats to Electric Shock.* KNIGHT DUNLAP,  
Johns Hopkins University.

In connection with certain curious statements in a report of an outstanding experiment in which electric stimulation was employed to motivate rats to learn, it seemed desirable to determine the susceptibility of rats to electric currents of measured volume and duration. This determination has not covered the entire field, but the results leave us still more puzzled by the curious statements mentioned, and suggest that failure to control the electric stimulation may have been in part responsible for the apparently striking results. Indications of differential susceptibility of rats of different types, and under different conditions, suggest problems for more critical investigation which are interesting and may be highly important. [15 min.]

PROGRAM: CLINICAL PSYCHOLOGY

THURSDAY, SEPTEMBER 8, 3:00 P.M.

ROOM C, GOLDWIN SMITH HALL

J. BURT MINER, *Chairman*

*The Function of Psychologists in Mental Clinics and Hospitals.*

LOWELL S. SELLING, Institute for Juvenile Research, Chicago.

Since the standardization of the Binet tests, clinicians in fields closely allied to psychology have become greatly dependent upon

those specifically trained in the methods of clinical psychology. Psychiatrists and physicians in mental clinics should be trained in clinical psychology as well as in mental medicine, but due to administrative and legal complications, they are still dependent upon those trained in the testing field who can work subordinatedly or coordinately with them. Investigation of the opportunities offered those who are trained in mental testing and abnormal psychology depicts many different points of view regarding the preparation, the value of the services, the qualifications for employment in different types of positions, the duties and the rewards offered. As a result of these findings suggestions can be made which might be set up as tentative standards for psychologists in this field. [10 min.]

*A Report on the Training and Experience of Clinical Psychologists.*

ANDREW W. BROWN, Institute for Juvenile Research, Chicago.

At the business meeting of the Clinical Section of the A.P.A. held in Toronto last year a motion was passed that the Chairman appoint a committee to make a survey of the training and duties of clinical psychologists in this country and Canada. Dr. Maud A. Merrill, Dr. Clara H. Town, and the writer were asked to serve as the committee. This paper is a preliminary report of the work. For the survey the members of the committee jointly framed a questionnaire which has been sent to over seven hundred psychologists including those who in the 1931 Year Book of the A.P.A. indicated that they were interested in clinical, child, or abnormal psychology, and other psychologists in the various clinics listed in the Directory of Psychiatric Clinics, and also others whose names were mentioned by the foregoing psychologists. The questions asked were designed to cover (1) training and experience, (2) salaries, (3) type of service work done by the psychologists, (4) time devoted to research, (5) type of teaching done by the clinical psychologists, (6) time division of work, (7) clinical organization, (8) student training, and (9) miscellaneous data. Thus far a substantial number of those to whom the questionnaire has been sent have responded, and the data have been tabulated. A follow-up letter is being sent to those who have not yet made returns, in an effort to make the survey as complete as possible. [15 min.]

*Standards of Training and Qualification for the Clinical Psychologist.* LOUISE E. PULL, Children's Hospital, Randall's Island, N. Y.

The Association of Consulting Psychologists has approved standards submitted by a committee on qualifications and training. They

are presented to the Section of Clinical Psychology in the hope that psychologists may find in them the basis for a common standard in this country.

Basal training courses are suggested for the undergraduate college electives, and for the graduate years. The latter are subdivided into required and supplementary courses.

Professional status is defined in three ranks by qualification and duties: (1) Assistant Psychologist; (2) Junior Psychologist, and (3) Senior Psychologist.

Experience is defined quantitatively in number of hours per week, and qualitatively in types of work.

These standards represent the consensus of opinion of psychologists who have had at least ten years of experience in clinics. [10 min.]

*Psychological Consultation as an Educational Technique.* EMILY LEATHERMAN STOGDILL, Ohio State University.

Sound psychological interviewing is an educational procedure of the greatest significance. Maladjustment of any degree whatever is viewed as a learned form of inadequate behavior, rather than as a result of the functioning of obscure psychic mechanisms. This viewpoint calls for considerable reorganization in our present conception of mental hygiene work with the college student. Its value is not restricted to the grossly maladjusted members of the student body. Instead of thinking of the clinician in our universities as a salvaging officer, we need to think of him as an educational specialist whose services should be available to the entire campus. [10 min.]

*Mental Retardation as a Result of Birth Injury.* EDGAR A. DOLL, The Training School, Vineland, N. J.

Intracranial hemorrhages at birth are known to produce impairment in (1) motor coordination, (2) mental development, and (3) personality adjustments. These consequences of birth trauma are of much interest to general psychology and have a practical bearing in the field of clinical psychology. Dyskinesia is usually associated with birth trauma, and presents special problems in the field of mental diagnosis. Such material has definite theoretical import in the field of genetic psychology. This report is confined to the effects of birth injuries on mental development, especially with reference to the production of mental deficiency. A survey of 435 institutionalized cases of mental deficiency, conducted in collaboration with Dr. Winthrop M. Phelps, revealed 44 cases, or 10 per cent, in which birth injury was etiologically associated with mental deficiency. Thus,

birth injury is found to be one of the principal causes of secondary amentia. Motion pictures will be presented, showing representative cases of spasticity and athetosis as the principal motor symptoms of the condition. These pictures will show typical reactions of birth-injured mentally deficient subjects. [15 min.]

PROGRAM: CHILD PSYCHOLOGY

FRIDAY, SEPTEMBER 9, 9:00 A.M.

ROOM A, GOLDWIN SMITH HALL

JOHN F. DASHIELL, *Chairman*

*Form Discrimination in Chimpanzees and Two-Year-Old Children.*

LOUIS W. GELLERMANN, Yale University.

Two chimpanzees and two two-year-old children were trained and tested in form discrimination with practically identical experimental procedures. The work was done in an alternation-box apparatus equipped with a new type of form presentation frame. Data were obtained on the following general problems: (1) the discrimination of triangularity *per se*; (2) the relative efficacy of form vs. background in the discrimination of visual patterns; (3) the relative efficacy of the negative vs. the positive stimuli in the discrimination of visual patterns; and (4) the influence of having learned certain combinations upon the learning of various new combinations of figures and backgrounds.

In connection with the first problem tests were made of the influence upon the discrimination of triangularity of: (a) changes of negative figure; (b) rotation of both positive and negative figures; (c) color changes; (d) relative size; (e) solid vs. "equivalent" figures; (f) vertex vs. baseline; and (g) gradual rounding the sides of the triangle to approach a circle. In the second problem a large number of tests were made utilizing seven different forms as figure and six different forms as background. Throughout these tests only the positive figure (a cross) was kept constant. As a final test the "cue" was shifted from the figure to the background. In the third problem tests were conducted in both of the above series on the efficacy of the positive and negative stimuli when used alone and in combination with new forms. In connection with the fourth problem tests were made with recombinations and reversals of earlier form combinations, and also with identical forms differing in degree of rotation.



The results will be presented both from the comparative standpoint and in connection with an analysis of the problems listed above. Also the verbal behavior of the children will be presented both in its relation to the various visual patterns and in connection with the self-administration of instructions. [15 min.]

*Experiments upon a Human and a Chimpanzee Infant After Six Months in the Same Environment. A Motion Picture Demonstration.* W. N. KELLOGG, Indiana University.

This is the second report of W. N. and L. A. Kellogg covering specific phases of their attempts at "humanizing the ape." It deals with comparative experiments upon a human and a chimpanzee infant of approximately the same age, who were given identical treatment for a period of nine months in a strictly human environment in which the experimenters served respectively as "father" and "mother" to the two subjects. The project was made possible through the financial assistance of the Social Science Research Council and the generous coöperation and direction of Professor Robert M. Yerkes of Yale University.

The results showed the ape to be actually superior to the human subject by a considerable number of the psychological criteria which could be applied. It learned more rapidly, remembered longer, and was in general more tractable as a subject. At one time in fact the animal made differential responses to a larger number of words and phrases than the human infant although towards the end of the period of observation the child caught up with and slightly surpassed the ape in this respect.

The present report reviews five comparative experiments, selected from a larger number, which were conducted during the last three months of the project. The ages of the subjects at the beginning of the interval covered by the report were: ape—thirteen and a half months, child—sixteen months. A fifteen minute reel of motion pictures shows the ultimate solution of each subject to the following problems: (1) the hand-in-loop experiment, (2) foot-in-loop experiment, (3) sound localization experiment, (4) suspended food test, (5) hoe or rake experiment. [15 min.]

*A Photographic Atlas of Infant Behavior Patterns.* ARNOLD GESELL, Yale University.

The cinema has been used at the Yale Clinic of Child Development for an inventory and charting of the growth of behavior patterns in human infancy. The subjects are normal infants selected



as to race, gestation period, health, parentage and socio-economic factors. Twenty-five or more children have been examined at lunar month intervals from four weeks through fifty-six weeks of age. The infants were observed in a specially designed clinical crib, under controlled conditions. The data include stenographic and cinema records covering the fields of posture, locomotion, prehension, manipulation, attentional regard, exploitive and adaptive behavior. This behavior survey has been in progress for six years and has been accomplished through coördinated studies by research members of the staff of the clinic. A cinema survey of a naturalistic character has also been made to chart aspects of the infant's daily life and social behavior.

The cinema records supply the objective data and also the tool for a systematic analysis and delineation of developmental patterning. In the first film 200 successive frames portray 12 seconds of behavior. Eight frames more or less are selected to depict with time values the most salient phases of a total behavior pattern in a single situation. Such stilled pattern phases are being codified through a cumulative photographic atlas. This atlas with accompanying text will be published in loose leaf form to make it more serviceable for the genetic and normative study of early mental growth. The organization of the atlas and its relation to the basic cinema records will be demonstrated. [15 min.]

*From Reflex to Muscular Control in the Development of an Erect Posture and Ambulation in the Human Infant.* (Illustrated by cinematographic record.) MYRTLE B. MCGRAW, Sloane Hospital for Women, New York City.

Phylogenetically and ontogenetically the assumption of an erect posture and ambulation are of paramount developmental significance. Sitting with support, sitting alone, standing with support, standing alone; walking with help and without help are items which occupy a conspicuous place in the infant developmental scales such as those of Gesell, Hetzer and Wolf, Figurin and Denisoff, and Linfert and Hierholzer, etc.

It is well established, however, that many infants in the first few days of life will momentarily perform many of these acts such as sitting with support, standing with support, or taking walking steps with help. A study of the phases of development from this reflex type of behavior to that of muscular control offers much in furthering an understanding of the general process of neural and functional development. The assumption of an erect posture is essentially a resistance to the pull of gravity and is easily measured in the growing

infant in terms of precision and degree of such resistance. Detailed analysis of the increasing control of the infant in his resistance to gravity when raised from a supine to sitting and standing postures has been made and the phases of development from complete passivity to complete integrated control have been defined. The development of the infant in this respect is cephalo-caudad and the increase in control is gradual. There is no indication of a sudden maturation of function in this respect. The prancing steps of the newborn indicate that the neuromuscular mechanism of this particular activity is functioning on a reflex level at the time of birth but actual walking is delayed, until cortical integration has become established. Studies of the phases of development indicate that both the assumption of an erect posture and ambulation are the result of the combined process of maturation and learning. [15 min.]

*Results from the California Behavior Inventory for Nursery School Children.* HERBERT S. CONRAD, Institute of Child Welfare, University of California.

The California Behavior Inventory for Nursery School Children consists of 231 definitions of character traits, in which children are rated on a seven-point scale. The judge is asked to rate each child in comparison with others of the same chronological age. In addition, the judge records whether or not, for the particular child being rated, the trait being rated is considered of outstanding importance in the child's personality. The confidence with which each child is rated in each trait is also recorded, on a three-point scale.

Approximately 25,000 ratings by three nursery school teachers have been given statistical analysis. The agreement between two judges for a specific trait is, on the average, about .50; but between two teams of three judges each, for composites of about five to ten traits, the agreement averages close to .90. Many factors affect the value of personality ratings. Self-correlations, and correlations between judges, vary greatly both with the trait and the child being rated; ratings made with high confidence are better than those made with low or average confidence; traits of outstanding significance in the personality of the child being judged, are rated much more satisfactorily than traits of less significance.

A number of circumstances favorable to validity—such as the comparative naïveté of preschool behavior, and the excellent facilities for observation in the nursery school—force us to discount the possibility of obtaining equally good results in groups of older children

or adults. At least among nursery school children, however, it appears clear that ratings of character may be highly serviceable. [15 min.]

*Attitudes of Parents, Students and Mental Hygienists Toward Children's Behavior.* RALPH M. STOGDILL, Ohio State University.

An attitude scale has been devised consisting of seventy items of child behavior ranging from extreme introvert behavior (bashfulness, daydreaming) to extreme extrovert behavior (bossiness, quarrelsomeness), each item to be rated on a 1 to 10 scale according to the seriousness or undesirability of the behavior. Ratings have been obtained from 110 parents, 45 college students, and 50 authorities on child guidance.

Rank order correlations (when the items are ranked from most serious to least serious for each respective group) are as follows: parents with student  $+.94$ ; students with mental hygienists  $+.58$ ; parents with mental hygienists  $+.45$ .

Parents and students are practically unanimous in their agreement that violations of social taboos and opposition to parental control are the most undesirable forms of child behavior. Mental hygienists, on the contrary, attached more seriousness to introvert and unsocial behavior indicating emotional and social maladjustment. [10 min.]

*Ocular Dominance in Young Children.* RUTH UPDEGRAFF, University of Iowa.

It has been fairly well established in the case of adults that one of the eyes is consistently dominant in those situations in which there must be a choice between the two images. The present study is part of one which has been undertaken in the hope of determining how early in life this dominance may be found.

An adaptation of the Miles ABC Vision Test was given to 190 children from two to six years of age; retests were administered at varying intervals.

The test proved reliable for children from three to six years of age and consistency of dominance over a period of years was apparent. For many children ocular dominance as measured by this test is not established before the age of three; thereafter it is commonly found. Relative frequency of right and left eyedness is comparable to that of older children and adults. [10 min.]

*Correlatives of Birth-Order.* MAZIE EARLE WAGNER, University of Buffalo.

Five successive college classes were surveyed to determine the percentage of youngest, middle, oldest, and only children (miscar-

riages, still births, and children dying under one year not included). The eldest were found in disproportionately large, the middlers in disproportionately small percentages.

A sampling of graduate students in social science (predominantly psychologists) were surveyed. Here also the eldest appeared in even larger, the middlers in even smaller percentages.

High school standing and college aptitude scores for the college birth-order groups were investigated. (It is realized that the samplings for the different birth orders are not random.) The eldest have the advantage in college aptitude; the "onlies" and youngest boys tied with, the middlers and youngest girls were lower than the eldest in high school fifth.

Finally, questionnaires filled in by the various birth-order college groups were examined for group differences in attitudes. [10 min.]

PROGRAM: SENSORY PHENOMENA

FRIDAY, SEPTEMBER 9, 9:45 A.M.

ROOM C, GOLDWIN SMITH HALL

J. McKEEN CATTELL, *Chairman*

*The Dependence of Auditory Localization upon Pitch.* FORREST LEE DIMMICK, Hobart College.

In a recent article C. C. Pratt offers a solution of a problem that has been the source of much speculation. He made a direct experimental attack upon the question: "Why should the difference among tones which we ordinarily know as pitch or brightness be designated by the spatial terms 'high' and 'low'?" Heretofore, explanations of this point have pretty well agreed that the spatial reference is merely figurative. Pratt, however, contends that tones have an intrinsic spatial character which is signified by the terms "high" and "low." He says, "*High tones are phenomenologically higher in space than low ones.*"

This finding seemed to us one that ought to be easily demonstrable if correct, but in our preliminary attempts we were unable to duplicate Pratt's results. We repeated and extended his experiments with several variations and found that localization in the vertical dimension is difficult if not impossible. So long as the observers maintained a true localization attitude, the vertical position of a tone was uninfluenced by its pitch. This held no matter from what horizontal direction (front, back, or side) the sounds came. The reports of the



observers on their bases of localization bear out their results. We must conclude, therefore, that when observers are instructed to localize the vertical position of a tone they are uninfluenced by the pitch of that tone if they maintain a strict localization attitude, and that there is no intrinsic spatial height in "high" tones. [15 min.]

*Response of Cats Conditioned to Auditory Stimuli to Electrical Currents of Auditory Frequencies.* GEORGE KREEZER, Cornell University.

As a result of a number of recent investigations upon the auditory nerve of the cat, it has been stated that auditory action-currents have the same frequency and form as the sound-waves serving as stimuli. This conclusion, considered in the light of certain other neural facts, seems to justify the prediction that electrical currents of such forms and frequencies should be adequate to stimulate the auditory nerve. It was the purpose of this experiment to test this prediction. Two cats were trained, after the method of Kalischer, to respond to food with grasping movements when a sound-stimulus was provided at the same time, and to refrain from grasping when the food was presented without the sound. The training period was continued until the cats distinguished perfectly between the two situations. The animals were trained, moreover, to respond to any tone regardless of difference in location, complexity, frequency, or intensity of the tonal stimulus. Upon completion of this period of training, the cats were placed under ether anaesthesia, and two small electrodes were inserted under the skin. A further training period followed the recovery. The cats were then tested for their response to electrical currents of the same frequencies as the auditory stimuli that had been used. Contrary to expectations, in no case did the animals respond to the electrical current in the way in which they had been trained to respond to acoustic stimuli. The significance of these results for auditory theory, within the limits of reliability of the method, will be briefly discussed. (These experiments were performed in collaboration with Hans Darge.) [15 min.]

*The Functions of the Semi-Circular Canals: A Study of the Variability in Behavior After Experimental Lesions in the Canals.* FRANKLIN FEARING, Northwestern University.

The present study is a continuation of the investigation of the effects of experimental extirpation of sections of the semi-circular canals in pigeons of which a report was made at the last meeting of the Association. At that time the operative technique and experi-

mental methods were described, and the results of several months of postoperative observations were presented. The chief feature of this method was the use of an obstacle maze in which the animals were trained before the operation. The purpose of this maze was to afford a series of situations in which the bird may be periodically tested for specific equilibratory disturbances after experimental destruction of portions of the vestibular mechanism.

In the previous paper the comment was made that "contrary to the classical and contemporary reports of this type of investigation, there is enormous variability both as to type and severity of symptoms following surgical interference with the canals." In the present report this variability in postoperative behavior is studied in detail with special reference to the following points:

(1) The description of the types of postoperative symptoms and their analysis both as to frequency, time of appearance, and persistence.

(2) The study of such symptoms in relation to varying types of experimental lesions (unilateral or bilateral removal of one ampulla, complete bilateral destruction of the ampullae, etc.).

(3) The comparison of symptoms in a group of birds which have been subjected to the same type of operation but in which the postoperative symptoms have shown wide variability.

The writer was assisted in this study by Miss Muriel Murray and Miss Georgia Ross, graduate students at Northwestern University. The present experiments are part of an investigation made possible by special grants from the National Research Council and Northwestern University. [15 min.]

*An Analytical Study of Habituation to Rotation.* G. R. WENDT, Yale University.

A photographic study of the modification of nystagmoid eye movements resulting from repeated bodily rotations has been made under a variety of stimulus situations. Normal and pathological humans and monkeys were studied. The results have led to the following generalizations about the character of modifiability:

(a) The first effect of the repetition or continuance of a new situation is ordinarily in the direction of greater adequacy of adjustment, *i.e.*, the reactions become progressively more perfect as adjustments to the stimulus situation. This process may be described as one of *regularization* and *systematization* of response. (The conditioned reflex hypothesis has been examined for its application to these results and laid aside as being of less value than functional or dynamic

descriptions in the present state of the evidence. As the conditioning hypothesis stands it seems to describe *only a segment* of the modification process.)

(b) If the reaction is inadequate or ceases to be of functional value, *other response systems compete with it for dominance*. For a time there may be shifts of dominance of control of the final common path, but finally one system becomes persistent. (This process is ordinarily described as "negative adaptation," but these results hold no justification for this term as it is commonly understood. They show, on the contrary, that the dropping out of the reflexes to rotation is due to their replacement by another eye movement system. The nature of this new system has been analyzed in detail.)

(c) The character of the modification of responses is determined by *the whole stimulus situation* rather than by the temporally adjacent elements. [15 min.]

*Heyman's Law in a Reflex Response.* HELEN PEAK, Yale University.

Breaking the primary circuit of an inductorium produced a sudden noise in headphones in the secondary, eliciting a lid-reflex which was recorded photographically. The effect of varying the intensity of a first noise stimulus on the amplitude of the response to a second noise of constant intensity was determined when the stimuli followed each other at three different time intervals. Results indicate that increasing the intensity of the first stimulus decreases the amplitude of the second response to a point beyond which increase in intensity of the first stimulus increases the second response. This facilitative function of intense stimuli becomes increasingly evident as the interval between stimuli is increased. This suggests that Heyman's law operates within certain limits but that the total effect of intensity of one stimulus on the lid reaction to another cannot be stated in this law. [10 min.]

*An Empirical Comparison of Audition, Vision and Touch in the Discrimination of Short Intervals of Time.* LOUIS D. GOODFELLOW, Northwestern University.

Differential sensitivity to intervals of time one second in length was studied for three sense modalities: audition, vision, and touch. Eighteen O's took part in this research, making a total of 14,000 judgments by the method of Right and Wrong Cases; 1,000 judgments by the method of Reproduction, and 1,000 estimates by the method of Just Noticeable Difference. All three approaches to the problem showed that audition gave the keenest differential sensi-

tivity; was least variable and most reliable. Vision gave the exact opposite and touch lay between audition and vision on all three scores. The threshold values obtained by the method of Right and Wrong Cases were slightly greater, and for the Just Noticeable Difference Method slightly but consistently lower—the difference being about twenty sigmas. [10 min.]

*An Experimental Comparison of the Production, and Auditory Discrimination by Absolute Impression, of a Constant Tempo.*  
SAMUEL RENSHAW, Ohio State University.

During two years a series of ten experiments was made in which twenty S's were trained in the production and discrimination of "unfilled" temporal intervals of 1 sec. and 5 sec. Five S's in 159 days produced 120 1-sec. intervals daily, a total of 19,080 intervals. Algebraic summation of the errors shows that, considered as a human clock, the S's ran slow by 0.2 per cent. The composite of plus and minus errors was 1.2 per cent. Individual S's exceeded this accuracy of production. Subjects can be trained to produce an "absolute" tempo. If a series of clicks 20 and 40 per cent faster and slower than the standard were delivered to the S's ears while he was producing the standard tempo, a series of paradoxical results are secured. These will be illustrated graphically.

After the production learning curves reach the asymptote, if the S's now make 30 serial groups judgments daily for 35 days on clicks in the headphones varying up to 40 per cent greater and less than the standard tempo and we compare the accuracy of judgment of the auditory impressions with the accuracy of production at the same time, there is virtually no relationship in magnitude or direction of the error.

The theoretical implication is obvious. Motor theories of auditory perception of tempo which assume a kinaesthetic frame of reference for the judgments do not fit these experimental results. In fact, the protocols show that those subjects who sought to better their auditory discriminations by tapping with hands or feet, counting, or making any phasic movement, made poorer judgments than those who listened in an alert yet immobile posture. Step-wise shifts in daily auditory discrimination error were found to be unaccompanied by similar trends in the error of production. [15 min.]

*Influence of Stimulus Temperature and Pressure upon Thermal Sensitivity.* FLORIEN HEISER, Yale University.

An apparatus was constructed permitting the control of many of the factors of temperature stimulation, such as stimulus temperature,



pressure, duration, size, and time interval, factors of skin condition and location, the subject's attention, and room temperature.

Two series of experiments have been completed showing the effect of different stimulus temperatures and pressures upon temperature responses. In the first series, in which seventy-three different areas were explored, the stimulus temperature was systematically varied (35°, 39°, 43°, and 47° C.) and the other stimulus factors were held constant. It was found that the number of temperature responses within an area increase directly with the stimulus temperature. In the second series sixty-four different areas were explored with four different stimulus pressures (1, 2, 4, and 6 gm.). It was found that the number of temperature responses increased directly with the stimulus pressure. [10 min.]

PROGRAM: ABNORMAL PSYCHOLOGY

FRIDAY, SEPTEMBER 9, 10:30 A.M.

AMPHITHEATER, STIMSON HALL

KNIGHT DUNLAP, *Chairman*

*Changes in Motor and Sensory Chronaxy Produced by Hypnotic Suggestion.* ERICH LINDEMANN, University of Iowa.

In the endeavor to render studies in chronaxy more reliable an apparatus was developed which furnishes an objective record of the frequency and duration of the chronaxy stimuli as well as of the response of the subject.

With the aid of this instrument we were able to demonstrate changes in neuromuscular and sensory excitability in functional disorders. It was found that during hysterical paralysis as well as under the influence of hypnotic suggestion the responsiveness of the stimulated tissue was changed in a lawful way.

The findings encourage us to pursue further this new neurophysiological approach to the phenomena met with in hypnosis. [10 min.]

*The Responses of Three Psychotic Groups to a Suggestibility Test.* GRIFFITH W. WILLIAMS, University of Rochester.

A test of suggestibility which has been used with normal individuals is applied to 53 Catatonic Dementia Praecox patients, 12 Paranoid Dementia Praecox patients, and 18 Manic-Depressives,

Manic Phase. Suggestions are given to the blindfolded patient that he is falling forward and a record made of the resulting bodily movements. Responses indicate positive suggestibility, negativism and a group in which no response is made.

The Catatonics gave 59 per cent negativistic responses, the Paranoid group 54 per cent positive responses and 58 per cent of the Manic records showed no response. Results show that (1) it is possible to make objective records of negativistic catatonic responses; (2) the Paranoid group tends to be positively suggestible and the Catatonic group negatively suggestible; (3) the Manics show a tendency not to respond to outside stimulation in spite of their marked distractibility, a result which facilitates the distinction of suggestibility from distractibility. [10 min.]

*A Study of Certain Aspects of Motor Coördination in Schizophrenia with the Prod Meter.* DAVID SHAKOW, Worcester State Hospital.

This study is part of an elaborate biochemical, psychological, and psychiatric investigation of the characteristics of schizophrenia made at Worcester State Hospital in the years 1931-1932. The prod test was only one of a battery on motor functions included in a large group of psychological tests and experiments. Both the diagnostic and theoretical aspects of the problem were of interest. A group of 100 male schizophrenic patients of different diagnostic types are reported. The apparatus used was a Koerth Pursuit Meter with the Miles Prod feature. A short practice period was followed by ten trials of ten revolutions each. The number of contacts and the time necessary for ten revolutions were recorded. The test was given three times at exactly three month intervals. For the second and third periods the report is based on 50 patients. A report on a group of normal controls having at least one session is included. As between normals and schizophrenics significant differences are found in time and number of contacts. Both variability among and within individuals are higher in the schizophrenics. Within the schizophrenic group positive, although low, correlations are found with age and hospital stay. Consistent improvement is noted from period to period but improvement within the period is shown only at the first session. Analysis by types of performance at the first session shows distinct differences between paranoids who give the best performance and catatonics who are the worst. The hebephrenic type falls in between. In later periods there is a tendency for the differences to become less marked. The theoretical implications of the findings are discussed. [15 min.]

*Eye-Hand Coördination in Schizophrenic Patients and Normals as Measured by the Pursuit Meter.* PAUL E. HUSTON, Worcester State Hospital.

As part of a research on schizophrenics, eye-hand coördination was measured on them and on normals with a modified Koerth Pursuit Rotor. The apparatus was arranged for the subject to follow, with a pointer, a target on a turn-table which revolved at one revolution per second. Each experiment consisted of ten trials of ten revolutions of the turn-table. One hundred patients and a large group of normals were tested once, and about fifty patients retested twice at three month intervals. Retests were done on some of the normals. The results show that the mean score for the schizophrenics is significantly different from the normals. Likewise, the schizophrenic range is greater than the normal. When divided into psychiatric sub-groups the mean of the paranoids and indeterminates is the highest, the hebephrenics next, and the catatonics lowest. The paranoids do not, however, reach the normal level. Improvement of performance of the normals is greater. The patients who were retested show continued improvement in all periods as contrasted with the prod experiment where improvement comes in the first period. This fundamental difference between the prod and pursuit tests is discussed. The greatest increase in score was made by the paranoids and indeterminates, the least by the hebephrenics and catatonics; however, the normal mean is still higher than the paranoid. The catatonics manifest marked improvement from the last trial of one test to the first of another while the other groups do not. The correlations found between pursuit and prod, steadiness, tapping, age, and hospital stay are presented and some of the theoretical implications are discussed. [15 min.]

*Muscular Tonus in Psychotics.* SIEGFRIED E. KATZ, New York State Psychiatric Institute and Hospital.

In the quantitative studies of human muscle tonus, McKinley and Berkwitz reported on a group of "normals" and on patients suffering from an organic disease of the central nervous system, such as hemiplegia, progressive muscular dystrophy, and paralysis agitans. We are interested in extending the investigation to psychotic patients in whom an organic condition may or may not be present. Seventeen psychotic patients have been studied.

We followed McKinley's technique; but we improved the apparatus from the standpoint of recording and sensitivity.

Our findings show that there is considerable daily variation in

muscle tonus in the same patient. The variation is greater in the manic state than in other conditions. There is no correlation between tonicity, age, basal metabolic rate, height-weight ratio or the menstrual cycle.

The manic patients show considerably more deviation and a higher central tendency in both extension and flexion, than any of the other clinical groups. [10 min.]

*The Concept of Egomorphism.* GILBERT J. RICH, Institute for Juvenile Research, Chicago.

In any person who deals with the reactions of others there is a dynamic force which causes him to interpret these reactions in terms of his own needs. The term egomorphism is suggested to describe this trend. It is a particular application of the mechanisms of projection and identification, and may be considered as the opposite of resistance.

The advance of psychology and psychopathology has been by way of the growth of widely variant schools of thought. This diversity of theory can be understood only in terms of each psychologist's inner needs, which he continually projects into his explanations and procedures. The originators of the schools were led to their particular doctrines as means of satisfying themselves, and the disciples are usually attracted to a teacher who fills their own needs. Psychologists frequently fail to recognize the universality of egomorphic trends in their work. [10 min.]

PROGRAM: ANIMAL PSYCHOLOGY

FRIDAY, SEPTEMBER 9, 1:30 P.M.

ROOM A, GOLDWIN SMITH HALL

HARVEY A. CARR, *Chairman*

*The Inheritance of Maze Ability.* R. C. TRYON, University of California.

The experimental program aims to ascertain the degree to which individual differences in maze ability of rats are determined by hereditary factors, the nature and generality of these factors and their psychological expression. The first objective is to establish pure lines of bright and dull animals. The procedure is to run the rats on a 17-unit T-maze, and on the basis of errors made, selectively to breed for brightness and dullness until the lines are established. Strict



environmental control is enforced from birth to the end of the maze running period, and special controls of the maze runs are secured by inducting the animal into the maze by an automatic delivery table and recording his errors and time by an electrical device. The maze scores of the initial unselected population of 142 rats gave a reliability coefficient of .99. Eight generations of rats, consisting of 1,320 animals, have been run and assortatively mated, and a race of bright and one of dull animals have been fairly well established. The crucial genetic crosses to discover the nature of the genetic determiners have yet to be made. Statistical analyses show that the determiners of this maze ability do not operate in such somatic characters as weight, sex, pigmentation, fertility, but further work on possible physical correlates is planned. Subsidiary experiments show that the factors determining this maze ability are fairly *general* regarding other maze abilities and that they persist as determiners of this maze ability throughout most of the rat's life span. Preliminary experiments have been started which aim to discover whether these maze determiners extend to other psychological functions (early developmental reactions, discrimination-capacities, insight, etc.). Extensive experiments involving gross variations in sensory features during the maze run indicate the differentiae of maze ability are expressed as a relational-generalizing capacity. [15 min.]

*Effects of Frontal Lobe Lesions on Retention of Delayed Reaction and Problem Box Habits in Monkeys.* CARLYLE F. JACOBSEN, Yale University.

Monkeys were trained on a series of problem boxes and were tested in delayed reaction situations of varying degrees of difficulty. Extensive bilateral ablation of the frontal lobes was followed by post-operative retention tests, the results of which are summarized as follows:

1. Responses to simple problem boxes showed no deterioration.
2. There was more or less severe impairment of responses to problem boxes which required the manipulation of several discreet elements.
3. After frontal injury there was serious interference with responses to hidden food situations in which an opaque door or open grill was placed before the animal during the period of delay.
4. If the visual and gross bodily orientation was not disturbed satisfactory responses could still be made after brief periods of delay. [10 min.]

*Brightness Discrimination After Removal of the Striate Cortex in Dogs.* DONALD G. MARQUIS, Yale University.

After extirpation of the occipital lobes, including the entire visual cortex (area striata), dogs showed no evidence of vision when examined by ordinary observational methods. They bumped into walls and objects, made no responses to food held or moved before their eyes, and did not blink nor flinch to menacing gestures. In previous studies it has been concluded on the basis of such observations that the dogs were completely blind. In the present investigations, these observations were supplemented by training in brightness discrimination, using a modified Yerkes-Watson apparatus. It was found that a stable habit of brightness discrimination could be established after complete removal of the area striata. Rigid control tests demonstrated that the only cue adequate for successful discrimination was the difference in light intensity. When the discrimination was learned prior to operation, the habit was severely impaired by extirpation of the area striata, and relearning required approximately the same amount of practice as the initial learning. The threshold of brightness discrimination was slightly impaired by removal of the area striata. Normal dogs discriminated between lights in the ratio of 1.2:1, while the threshold after removal of the area striata ranged from 1.5:1 to 2.5:1. This small reduction in light sensitivity does not appear adequate to explain the apparently complete loss of vision for objects, but until controlled tests for pattern vision are carried out, it can not be concluded that the dissociation is complete. Further experiments are in progress to determine whether the residual brightness discrimination is mediated by the extra-striatal cortex or by subcortical centers. [15 min.]

*Reflex and Conditioned Eyelid Reactions to Light in Normal Dogs and in Dogs with Occipital Lesion.* ERNEST R. HILGARD, Yale University.

The experiments were performed in collaboration with Dr. Donald G. Marquis, and the operated dogs are the ones used in his study of brightness discrimination. Eyelid reactions were recorded photographically, using the Dodge pendulum-photochronograph. Conditioned eyelid reactions to light were developed by repeatedly presenting the light 375  $\sigma$  before a controlled puff of air striking one cornea. Conditioned reactions appeared during the training series as lid closures anticipating the closure to the puff. The conditioned responses differed from the reflexes to light, as shown by (1) longer latency, (2) appearance chiefly on the side receiving the puff,

although the light was flashed in both eyes, and (3) the differing course of modification during conditioning and extinction. [10 min.]

*Fear Responses of White Rats in the Presence of Cats.* MARGARET WOOSTER CURTI, Smith College.

Certain experiments have indicated that the odor of cats is a specific stimulus to unlearned fear responses in white rats. To test this hypothesis, white rats isolated from cats from birth were observed in the presence of cats under varying conditions. In a specially devised apparatus rats of different ages were subjected to (1) the sight of a cat without odor, and (2) the odor of a cat without sight. The plan included observation of rats in an observation box under "natural" conditions. In none of the experimental situations did the rats exhibit clear-cut fear responses to the cat odor alone; but under certain conditions marked and definite responses occurred. It is planned to continue the study, using other small animals also, and observing especially reactions to visual and auditory as well as to olfactory stimuli. [10 min.]

*Sex Behavior in Infra-Human Primates as a Substitute Response Following Emotional Disturbances.* O. L. TINKLEPAUGH, Yale Anthropoid Experiment Station, Orange Park, Fla.

Other investigators have reported the occurrence of sex behavior in infra-human primates in response to asexual situations. Examination of these situations shows that they all lead to states of emotional tension in the subjects. Further observations on captive chimpanzees and monkeys show that in the young animals responses commonly are released after most if not all forms of emotional disturbance. In fear or anger, for example, where flight from or attack upon the stimulating object is inhibited by the confinement of the subject, the state of organic tension may be relieved through sex behavior. Increasing age in the infra-human primates brings better adaptation and greater specificity of responses to non-sexual stimuli. Then manifestation of sex behavior becomes less frequent and more commonly coincides with the psychobiological demands of the organism ordinarily termed sex hunger. [15 min.]

*A Statistical Analysis of Mating Behavior in Macacus Rhesus.* JOSEPHINE BALL, Carnegie Institution, Baltimore.

A report of 100 observations of the behavior of monkeys when mated for 2-hour periods.

The frequency of occurrence of various types of sex activity were

recorded. These records have been statistically examined for the purpose of discovering a measure of sexual excitability ("sex desire") in the female.

The analysis suggests what behavior to record and how to combine the scores to obtain a measure which, in this preliminary work, correlates with the menstrual cycle and would appear to be analogous to, though of a different shape from, the curve of sex desire in women as presented by various authors. [10 min.]

*Psychobiological Studies of the Primate Alouatta Palliata Inconsonans Goldman of Barro Colorado Island.* CLARENCE RAY CARPENTER, Institute for Research in Tropical America, Canal Zone.

The population of Barro Colorado is approximately 398 individuals living in 23 groups with fairly definite territorial ranges. There are 63 males, 170 females, and 165 young. The groups range in size from 4 to 35 animals, the average being 17.3. The average number of males, females and young are 2.74, 7.39, and 7.17 respectively per group. In each group there are sub-groups, most conspicuous of which are the associations of young with mothers, but females also become close consorts of males for periods of oestrus. Tongue and lip movements, postures and vocalizations constitute types of social communication. Feeding and rest alternate in the diurnal cycles of activity. [10 min.]

PROGRAM: CLINICAL PSYCHOLOGY

FRIDAY, SEPTEMBER 9, 2:15 P.M.

AMPHITHEATER, STIMSON HALL

FRED KUHLMANN, *Chairman*

*The Mental Development of Prematurely Born Children.* PHYLLIS BARTELME, Institute for Juvenile Research, Chicago.

The purpose of the present study is to determine the effect of premature birth upon the development of mental abilities. The data include parallel mental and physical examinations of prematurely born children and of their full term siblings. The prematurely born children all received the care of the Premature Infant Station of the Sarah Morris Hospital, Chicago. Our criterion of prematurity is one of weight: each child weighed 2,500 grams or less at birth. The



mean gestation period for this group was approximately seven months. For the measurement of mental growth, the Kuhlmann-Binet test and the Gesell Developmental Schedule were employed. For the Kuhlmann-Binet test, mental ages have been employed; for the Gesell Developmental Schedule, absolute scores were obtained for each child by a slight modification of Thurstone's method of scoring; the values of the individual test items were determined according to his method of "absolute scaling." It was found that the mental development of the prematurely born children followed closely that of their sibling controls and that of unselected groups. Within the age range tested, and by the tests employed, neither inferiority in amount of intelligence, nor inferiority in rate of development was observed. This is especially true if the statutory age of the prematures is "corrected" for the amount of prematurity. The results of this study lend support to Gesell's contention concerning the hereditary nature and relative unmodifiability of growth in infancy. [15 min.]

*Over-Protection in the Home as a Cause of School Failure.* CAROLINE B. ZACHRY, State Teachers College, Upper Montclair, N. J.

Adolescents, from seventh grade through college, were studied by the Mental Hygiene Institute over a period of two and a half years.  $N=561$ .

A number of cases, reported because of school failure, were due to over-protection in the home. Thirty such cases have been selected for further analysis.

Data obtained on thirty selected cases included: school record, teachers' opinions, intelligence tests, achievement tests, physical development, health history, social history (family history and family relationships), and psychiatric interview.

The study is largely diagnostic and reveals a relationship between over-dependency and school failure. Emotional causes of over-dependency have also been studied. Intensive treatment has been carried on in some cases and results noted. [10 min.]

*Remedial Reading in an Institution for Mentally Retarded Problem Children.* THORLEIF G. HEGGE, Wayne County Training School and University of Michigan.

A survey of a random sample of 100 institutional cases committed on account of maladjustment and severe educational and mental retardation (median chronological age 14-3, median I.Q. 68,

median ratio of reading age to mental age 1.05), indicates that 5 to 10 per cent are worth while cases for remedial training in reading, as judged by the following criteria: (1) The existence of specific retardation in reading as compared to mental age and arithmetic computation ability; (2) The prevalence of anomalies of reading and other anomalies associated with reading disability in children of normal intelligence; (3) Trainability.

Methods have been developed which make it possible accurately to select reading cases likely to profit permanently and significantly from special treatment ("A" cases).

Extensive remedial training in reading has been given to a group of 20 cases, composed chiefly of adolescents, whose interquartile range of I.Q.'s is from 65 to 80. Most of the group began training as first, or poor second grade readers. Cases were taught in individual 20 and 30 minute lessons by special methods. Of the training group, 15 had been selected as "A" cases. When tested in January, 1932, each of these had gained two grades per 200 lessons, or proportionately with fewer or more lessons. The majority had done much better; 9 tested at third grade or above. Of the 5 less promising cases, selected as interesting research problems, all had made some improvement.

There is some evidence of improvement in other school subjects and in general adjustment following reading training. Training is being continued with the 20 former cases and begun with new cases. Recent results and present outlook will be discussed. [15 min.]

*The Psycho-Medical Correction of the Drug Habit.* J. B. MINER, University of Kentucky.

Over sixty patients have been "taken off" the morphine habit by two physicians in Lexington, Kentucky, without the usual pain from gradual withdrawal of the drug. The method was discovered by Dr. O. Modinos of Alexandria, Egypt, and consists of hypodermic injections of blister-serum. It seems not to have been used elsewhere in this country. How the treatment suddenly removes all desire for the drug is unexplained. The ease of withdrawal within a week emphasizes the need for psychological differentiation of those who will soon form the habit again to secure temporary satisfaction from the drug or the companionship of other addicts. This report describes certain cases and asks coöperation in further developing a technique to discover the type likely to be restored permanently. [10 min.]

*On Relative Human Efficiency: Variations with Repetitions of Equivalent Test Forms.* EDWARD B. GREENE, University of Michigan.

In order to compare individuals, one must try to secure measures which represent the same relative efficiency in terms of method, motive and fatigue. The difficulties of evaluating these are very great, but a small beginning has been made in repeating equivalent test forms four or more times in a fairly large sample in the Detroit area.

The forms used were designed to consist of equivalent units of performance in a variety of tasks. The tasks ranged in difficulty from very easy to very complex, and included hand and eye coördination, feature comparison, and pencil mazes (Michigan Non-Verbal series). Equivalence of units was secured to a certain degree by employing similar musculature, symbols, complexity, and directions for all tasks whose results were added together into a numerical score.

The results shown by fairly normal samples at various ages indicate a marked difference between the easy tasks and the hard tasks. In the simpler mazes, the following group tendencies were noted: first, less improvement and less variation than on the more complex tasks; second, closer grouping (smaller S.D.'s) on the fourth trial than on the first trial (the opposite was true for the more complex tasks); third, higher correlations between subsequent trials than those found for the more complex tasks; individual S.D. scores have a Standard Error of Estimate from third to fourth trials on the simpler tasks of approximately .3 S.D. of the fourth trial distribution and 0.86 S.D. on the more complex tasks. Changes in method and motivation are cited to explain these results. [15 min.]

PROGRAM: APPLIED PSYCHOLOGY

FRIDAY, SEPTEMBER 9, 3:00 P.M.

ROOM C, GOLDWIN SMITH HALL

EDWARD C. TOLMAN, *Chairman*

*Studies in Scientific Typography.* MILES A. TINKER, University of Minnesota.

Valid conclusions concerning printing conditions which will produce optimum legibility depend upon methodological requirements

which have seldom been fulfilled in studies attempted in this field. Such requirements involve the use of equivalent forms of a "reliable" speed of reading test to measure changes in rate of normal reading produced by variation in typographical arrangement of textual material. The tests should be readily applicable to a large number of subjects. A method which fulfills these requirements will be described and controls emphasized. In a program of studies, now in its fifth year, this technique has been employed in collaboration with Donald G. Paterson to measure relative legibility of various printing arrangements in terms of speed of reading. This program will be outlined and the results reported for some of our recent investigations. Casual observation or inadequate investigation has led to pronounced views concerning legibility of print. These views will be criticized in relation to present findings. [15 min.]

*Visibility and Legibility of License Plates During Movement.* JAMES L. GRAHAM, Lehigh University.

This problem is important for highway safety, for example, to control offenders or to follow a car.

Laboratory apparatus was devised to compare legibility under conditions which varied the number of symbols exposed, the size of retinal image, and the background-figure combinations. A synchronous motor drove a turntable bearing a long arm upon which the plate was mounted. A clutch permitted changing plates, which were illuminated by daylight bulbs, tail or spot lights during a short movement of the plate. The subject observed through a strong reducing lens which effected a fairly rapid rate of change in the size of the visual image. Three conditions of legibility were quite constant, namely, distance, short exposure, and movement. Approximately fifty students acted as subjects either for small targets or full size license plates.

Five or more symbols and good reflecting surfaces were least legible. [10 min.]

*Measuring Responses Involved in Automotive Manipulation.* ALVHH R. LAUER, Iowa State College.

This paper is a summary of results obtained by the National Research Council Committee on "Psychology of the Highway." Three avenues of approach were undertaken. The first was an attempt to determine the most probable pattern of integrated responses in terms of isolated measures such as reaction time, motor



coördination, speed of movement, stability of response patterns, personal tempo, and different types of oculo-manual performance.

A coördination apparatus simulating actual driving was devised to be used in the laboratory for establishing the criterion. The subject controls a miniature car on a miniature traveling highway using standard automobile controls. Steering wheel, pedals, gear shift, and other responses are thus recorded on a polygraph tape. A reliability of  $+.80$  was obtained from test-retest correlations on this apparatus.

A test field 200 ft. by 500 ft. has been developed and standardized to establish further a criterion of driving. The reliability of the test is  $+.85$  when the driver uses the same car at different times. Responses to stop lights, standard highway signs, specific instructions along the route, parking in a minimum area, and other hazards are introduced.

Performances of men and women are found to differ. The average parking time for men is about 28.4 seconds while that of women is 65.1 seconds. The paper is supplemented by 16 mm. film and slides. About 300 drivers have been studied.

The object of the research has been to secure scientific data relative to automobile driving. The apparatus is now being used to determine, objectively, the effects of fatigue, loss of sleep, drugs, age, physical condition, long continued driving, training, visual efficiency, and other factors which are believed to affect driving. [15 min.]

*Distribution of Intelligence Test Scores, Age, and Schooling in a Factory Population.* MILLICENT POND, Scovill Manufacturing Co., Waterbury, Connecticut.

Every attempt to validate tests for selection of employees in an industrial situation faces the difficulty of obtaining reliable criteria with which to make comparison. Probably it will be necessary to accept different criteria for different occupational groups, and a generalized statement may not be possible for many years.

Aside from actual validation, however, a description of a factory population in terms of distributions of test scores, reported school levels, and age, in finely divided occupational groups, checked by close agreement between consecutive samples, has interest both psychological and sociological.

The data reported in this paper present such a description of the incoming male employees of a metal working plant, selected by ordinary employment methods (not including tests), during a relatively normal business period of five years, classified in 49 occupations, in

groups which range in size from 40 to 1,032 members. The tests used are the Army Alpha and Beta series, reliability of the battery,  $r=.908\pm.005$ . Average scores for the occupations correlate high with average intelligence rank given by seven judges to the occupations.

The main conclusions drawn are, (1) there is a wide range of scores and of schooling in each occupation, with much overlap between occupations; (2) this wide range persists almost unchanged for six months or more, in spite of losses from the group amounting to 60 per cent, and even in two years' time the occupational groups are still spread out over long ranges; (3) the interquartile range of scores and of schooling correlates with judgments of intelligence required for the occupations; (4) age distributions for the various occupations differ very little in average, range, or interquartile range. [15 min.]

*Occupational Ability Patterns.* M. R. TRABUE, Employment Stabilization Research Institute, University of Minnesota.

Attempts at vocational guidance have commonly been based upon a relatively small sampling of traits. The adviser, in using the grades received in school or the results of tests, has been influenced almost exclusively by high scores obtained in one or two subjects or tests.

E. K. Strong and others have demonstrated the vocational significance of interest patterns. The results tend to show that people who are successful and happy in a given profession tend to have similar interests, attitudes, likes, and dislikes.

The Minnesota Employment Research Institute has been working upon the theory that successful persons in a given occupation probably possess similar patterns of ability. The results obtained from the examination of more than fifteen hundred adults who are efficient enough to hold their positions during a severe depression indicate the usefulness of such occupational ability profiles. In order to give valid occupational advice to young people, it would appear that one must have adequate information regarding the distinctive patterns of ability, interest, personality, and experience that are characteristic of successful adults in different occupations. A number of the characteristic occupational ability patterns that have been developed in the Institute will be presented, with statistical data regarding them. [15 min.]

## PROGRAM: PHYSIOLOGICAL PSYCHOLOGY

SATURDAY, SEPTEMBER 10, 9:00 A.M.

ROOM A, GOLDWIN SMITH HALL

R. M. ELLIOTT, *Chairman*

*Nerve Impulses from Single Receptors in the Eye.* C. H. GRAHAM,  
University of Pennsylvania.

It has been possible to record impulses in the optic nerve of the horseshoe crab, *Limulus polyphemus*, by means of a battery coupled amplifier and Matthews' oscillograph. In the eye of this animal there are neither ganglion cells nor neural interconnections, and the nerve behaves in every way like a true sensory nerve.

Action potentials from the whole nerve were studied in the young animal. When the eye is illuminated there is developed a succession of slow potential changes, superimposed on which are the typical rapid changes associated with the conduction of nerve impulses. These impulses resemble the responses recorded from the optic nerve of the eel by Adrian and Matthews.

Single fibers are most easily obtained from the adult animal. This is due to the fact that the nerves of the older crabs are easily separated into bundles containing few fibers. The regularity in the discharge of impulses shown in the records is indicative of the fact that only one visual element is concerned. The impulse discharge from single receptors resembles that found by previous investigators from other sense cells, *e.g.*, tension receptors in muscle. The discharge starts after a short latent period at a high frequency, falls rapidly at first and then more slowly, tending to reach a constant value after several minutes. The frequency of impulses depends on the intensity of the stimulating light. Dark adaptation also modifies the discharge frequency, *i.e.*, the end organ responds to a stimulating light of given intensity with an initial frequency which is greater the longer the eye has been in the dark.

These experiments were done in collaboration with Dr. H. K. Hartline at the Johnson Foundation for Medical Physics, University of Pennsylvania. [15 min.]

*Simultaneous Galvanic Reactions in Different Skin Areas.* CHESTER W. DARROW, Institute for Juvenile Research, Chicago.

By means of a circuit affording continuous quantitative records in standard units employed with a string galvanometer, an indifferent

electrode (skin pierced), and a commutator automatically switching first one active electrode plus a compensating standard resistance, and then another active electrode plus a compensating standard, into the circuit, it is possible to record intermittently records of reaction from two or more different skin areas under identical experimental conditions without any influence of one set of changes upon the other.

Records of simultaneous galvanic reactions in different skin areas demonstrate that as the areas, such as the palms of the hands, from which the galvanic reactions are most easily elicited, drop in resistance and approach the limit of reactivity, other areas, such as the backs of the hands, become increasingly reactive, and in many instances show changes greater than those found in the palm. This electrical activity is accompanied by the secretion of sweat on the backs of the hands. Warm weather, nervous conditions, and strong or prolonged stimulation, resulting in excessive sweating of the palms, are especially favorable to an excess reactivity of the normally less active areas.

Records from symmetrically opposite parts of the body are shown to correspond closely in reaction and resistance level, except in certain pathological conditions. Hemiepilepsies, during quiet periods, tend to show higher palm resistance and greater reactivity on the affected side. Some stutterers and some schizophrenics have shown a galvanic asymmetry during quiescent periods which tends to disappear with speaking or under stimulation. Records from opposite sides of persons with normally symmetrical reactions are shown to give an ideal means for controlled demonstration of the influence of local conditions such as temperature, pressure, muscular tension, application of drugs, and suggestion. [15 min.]

*A Systematic Investigation of Methodology in the Measurement of Electrical Phenomena of the Skin.* T. W. FORBES and CARNEY LANDIS, New York Psychiatric Institute.

Although studies of electrical skin phenomena in the field of physiological psychology have yielded diverse results, anatomical and physiological studies show that these phenomena are essentially based on autonomic innervation of the skin. Much apparent divergency of results is undoubtedly due to introduction of biophysical factors making techniques incomparable. Our study now in progress attempts verification of claims for various techniques as well as investigation of apparent contradictions. The value of a consistent method resulting from such a unification of work in this field is obvious.



So far we have used the following methods: 60 cycle A.C. and D.C. Wheatstone bridge; null measurement of E.M.F.; and the circuit of Richter, with various electrodes attached to different parts of the body. Results show: measurements made by different circuits are generally incomparable; type of electrode affects results; D.C. Wheatstone bridge measures are of little value; variations from different parts of the body cannot usually be compared. [10 min.]

*Some Factors that Affect Body Potential and Skin Resistance and the Relation of These Factors to the Psycho-Galvanic Reflex.* ROY M. DORCUS and JOSEPH E. MORSH, Johns Hopkins University.

In this paper, some preliminary experiments dealing with changes in temperature, control of the sweat glands, and anaesthetization of the fingers, will be reported. The results of these investigations tend to throw some light on the relation between the actual physiological condition and sentienda in controlling the direction of flow of the body potential. In addition information has been obtained concerning the activity of the sweat glands on the skin resistance. The findings will clear up some of the problems that have been a constant source of trouble to the workers using the psycho-galvanic reflex. [10 min.]

*Conditioned Respiratory Changes.* C. R. GARVEY, Yale University.

Increases in the depth and irregularity of breathing following faradic stimulation were conditioned to the sound of a buzzer and the action of a finger vibrator. The purpose of the investigation was to study some of the phenomena of conditioning, such as summation of conditioned responses to compound stimuli and the effect of the temporal interval between test stimuli. The subjects were 38 college boys. The respiratory tracings were measured with the Hull oscilometer. Small reactions to the signal stimuli at the beginning of the experiment rapidly disappeared upon repetition of the unreinforced signals. This process of negative adaptation continued to a negative response value, indicating that adaptation may be, at least temporarily, an inhibition phenomenon. The question is raised as to whether the value of the original (pre-reinforcement) response to the signal should be subtracted from the post-reinforcement value to determine the magnitude of the conditioned response value. It is suggested that the post-reinforcement response should be taken at its face value, provided the number of presentations of the signal is such as would have produced complete adaptation without reinforce-

ment. The relation between the magnitude of the response and the length of interval preceding the test stimulus supports the expectation hypothesis of conditioned response. The lack of such relation in the case of subjects who were not conditioned confirms this support. Pavlov's results on summation were corroborated in that a compound signal, the components of which had been conditioned, produced greater conditioned responses than either of the components alone. Our results differ in that our compound signal produced responses even greater than the *sum* of the conditioned responses to the components alone. Reasons for this difference are discussed. [15 min.]

*Affectivity in Relation to Breathing and Gross Bodily Movement.*

HULSEY CASON, University of Wisconsin.

An experimental study was made of the feelings and emotions of subjects while they were looking at a number of specially selected pictures. Measures were obtained of the latent time and duration of the emotions, and of the breathing and gross bodily movement which occurred while the emotions were present. Gross bodily movement was measured by a specially constructed chair connected with recording apparatus, and the breathing by the number of electric contacts made by a belt apparatus. Thirty-two subjects were used, and each experimental period lasted for two hours. The quantitative results on latent time, duration, breathing, and movement were converted into 10-percentile scores on the basis of the results for each subject. (1) The correlations are positive between the speed and duration of the emotions and between breathing and gross bodily movement; (2) the latent time of pleasant and unpleasant emotions is approximately the same; (3) the latent time of emotions is definitely faster when the emotions are quite pleasant or unpleasant than when they are indifferent or only slightly pleasant or unpleasant; (4) the duration of emotions is longer for unpleasant than for pleasant emotions, and also longer when the emotions are quite pleasant or unpleasant than when they are indifferent or only slightly pleasant or unpleasant; (5) approximately the same amount of breathing and gross bodily movement occur during quite pleasant, indifferent, and quite unpleasant emotions; (6) when the data are calculated for different emotions, the greatest amount of variation occurs in the duration scores and the least amount in gross bodily movement; (7) some results are also given on sex differences in the feelings and emotions that were called out by the 60 most frequently used pictures. [15 min.]

*An Action Current Study of Handedness.* LEE EDWARD TRAVIS and DONALD B. LINDSLEY, University of Iowa.

Twenty right-handed and twenty left-handed normal speakers (groups carefully selected to represent "pure" handedness types) and twenty-four "right-handed" stutterers served as subjects. The authors determined previously that the flexor digitorum sublimis muscles gave, up to a certain amount of contraction, an increase in action current frequency with an increase in intensity of contraction. Beyond a certain degree of contraction the frequency of the action currents decreased. In the present study for all normal speakers the degree of contraction beyond which the action current frequency decreased was less in the non-dominant than in the dominant arm. For 65 per cent of the stutterers the degree of contraction beyond which the action current frequency decreased was either less in the right than in the left arm or equal in the two arms. [10 min.]

*The Effect of Alcohol on the Rate of Parotid Secretion.* A. L. WINSOR, Cornell University.

This study is a continuation of our investigation of the effect of drugs on parotid secretion in which we undertook to measure the quantitative variations in the normal flow from these glands subsequent to the ingestion of alcohol. Male adults served as subjects and alcohol in different forms was consumed under different conditions. Using the normal rate of secretion of the individual as a control, we found that alcohol in the mouth and stomach caused profuse secretion but upon its being absorbed into the blood there was a definite inhibition of secretion. The onset of the inhibition came at the end of a definite latent period of relatively short duration. The extent of the inhibition varied according to the dosage, the condition of the stomach, and individual differences in tolerance or resistance. When sufficient alcohol was administered to affect the behavior at all, the tendency toward inhibition was invariable. In no case was the ingestion of alcohol followed by an increase in the rate of secretion. The intensity of the inhibition was in direct proportion to the size of the dosage.

It would appear from our results that the traditional assumption that alcohol stimulates digestion should be reexamined. Apparently the stimulating effect would characterize the influence of alcohol in the stomach but once it is absorbed into the blood, its action would retard digestion. In general, our results support the findings of other psychologists and physiologists who have shown that alcohol retards and inhibits rather than stimulates behavior. It should no

longer be listed as a stimulant but preferably as a narcotic or depressant. [15 min.]

# PROGRAM: LEARNING

SATURDAY, SEPTEMBER 10, 9:45 A.M.

ROOM C, GOLDWIN SMITH HALL

JOHN F. SHEPARD, *Chairman*

## *Conditioned Responses of Higher Order with Constant Motivation.*

ELMER CULLER, University of Illinois.

Conditioned responses of higher order can be established, according to Pavlov, only within two or three stages of the unconditioned stimulus; all efforts to advance beyond the third order prove unavailing.

With the aid of Glen Finch, the problem was further investigated by this procedure; unconditioned response consists in withdrawal (flexion) of right foreleg when shock is applied to paw; conditioned stimulus of first order, tone; of second order, light; of third order, stream of water on nose; of fourth order, electric bell; of fifth order, electric fan playing on animal. In addition a general energizing stimulus was employed (shock to left thorax, administered whenever animal fails to flex leg and omitted upon each correct response).

By this procedure animals have been brought to perfect performance through all five orders or stages in succession. Conditioning to the fifth level was established eight weeks after flexion-response had, for the last time, been reinforced by unconditioned stimulus (shock to forepaw).

From the above it appears that conditioning may proceed indefinitely from one stage to another so long as animal is adequately energized or "motivated." Failure at any level is due to sub-liminal activation. [15 min.]

## *A New Hypothesis Interpreting the Phenomena of Serial Learning Order.* W. M. LEPLEY, Pennsylvania State College.

Two methods are assumed to operate in the serial learning of both man and lower animals: (1) a method involving relatively simple conditioning processes, and (2) a supplementary technique, differing not at all in its neurophysiological fundamentals, but involving symbolic acts, such as language. The difference between man and lower animals, as regards serial learning order, is deduced to be a



function of the extent to which the symbolic technique is involved. Experiment I. This hypothesis is supported by the finding that the same difference (in lesser degree), as regards serial order or learning, exists between an inferior group of seventh grade boys and a superior group of eleventh grade boys as exists between lower animal and human subjects. The older group exhibited a significantly more extensive tendency to learn from the anterior ends of non-sense syllable series. [10 min.]

*Attempted Learning Under Complete Motor Paralysis.* H. F. HARLOW, University of Wisconsin.

Experiments were carried out in conjunction with Ross Stagner in an attempt to check the behavioristic theory of learning, which assumes that a response is essential to the occurrence of learning. This was accomplished by the use of curare, which has the effect of blocking the myoneural junction of the striped muscles, without depressing the central nervous system or the receptors. Cats and dogs were maintained by artificial respiration, a tracheal cannula being inserted after muscular weakness had appeared, without the use of any anaesthetic which might affect the central nervous system.

After complete skeletal muscle paralysis had appeared, the animal was placed in an open grill, and the combined conditioned and unconditioned stimuli were presented thirty times. At each trial the conditioned stimulus, a bell, or a light, was presented for ten seconds, during the last five seconds of which the unconditioned stimulus, a shock, was given concurrently.

At the end of this period the effects of the curare were neutralized by physostigmine and the animal was allowed to recover completely, this taking from thirty minutes to one hour. Tests of conditioning, in which the bell alone was sounded, failed to give any evidence of learning, although in the control tests on the same animal immediately afterwards (without curare), conditioning invariably occurred in one trial and persisted for twenty-four hours. The response, including leaping from the grid and hiding from the experimenters, is not therefore a simple reflex but is an adaptive reaction.

These results indicate that learning does not take place if all skeletal muscles are inactivated, even if the viscera are functioning normally, as curare does not affect their neural junctions. They are not harmonious with the Gestalt theory that learning consists of a dynamic reorganization of neural patterns in the central nervous system, and appear to support the concept that learning involves peripheral activities. [15 min.]

*The Temporal Course of Error-Elimination in the Learning of a Stylus Maze.* JOHN A. MCGEOCH and HENRY N. PETERS, University of Missouri.

An adequate description of the discovery and fixation of the true pathway of a maze requires that we know in detail the time relations within the pattern as well as the total time spent. This paper reports a detailed study of the temporal course of the elimination of the individual alleys of a Warden 10-alley maze. Thirty college students learned the maze to a criterion of three successive perfect trials. Contact points at the entrance to each alley, connected with a recording pen which ran above a fifth-second time line, permitted the measurement of the time spent in each alley at each entrance.

The temporal course of elimination has been studied by an application of the Vincent curve technique to the data for each alley in three different ways. The curves for the individual alleys fail to show an asymptotic approach to the abscissa. After a brief period of initial adjustment and orientation, and particularly during the last half of the learning period, an alley is entered for a period of time which is, on the average, a constant for that alley, or it is not entered at all. This time is much longer than that required for a simple entrance-exit movement. Elimination occurs suddenly. The constancy of time spent and the sudden final elimination represent an all-or-none phenomenon in learning.

The all-or-none character of elimination occurs, it is suggested, because whatever cues or sensory consequences or effects are present require a certain minimum time in which to operate. It represents, thus, a temporal limen for effect. The results offer evidence against any theory which assumes a gradual elimination of errors or a progressive overlapping of responses, and have other implications for theories of learning. [15 min.]

*Changes in Grip Tension Following Electric Shock in Mirror Tracing.* WILSON McTEER, College of the City of Detroit.

Twenty subjects traced a grooved six-point star pattern fifteen times with a special stylus. Half of the subjects received electric shock punishment on the index finger of the active hand when an error was made; the others served as a control group. Records of time, errors, and grip changes in the inactive hand were obtained on a continuous record kymograph. The grip changes were recorded when there was a change in the pressure exerted on a bulb which the subject held. The use of the punishment resulted in an increase of time per trial in all trials, and a decrease of errors per trial in all

except the first two trials. Such punishment also tended to produce greater tension in the inactive hand during the course of the tracing activity. [10 min.]

*Recitation and Motor Learning.* R. H. WATERS, University of Arkansas.

The paper reports an experiment in which three groups of subjects spent the same amount of time in learning the stylus maze. One group spent the entire time in making fifteen consecutive runs, the second alternated its runs with verbal descriptions of the pathway, the third alternated its runs with drawings of the pathway. All groups attained equal mastery of the habit. Degree of retention after a week was approximately the same for all groups. Several hypotheses are suggested: First, the stylus maze is not a highly valid instrument for measuring motor learning. Second, the results indicate the extreme complexity of the learning process and emphasize the importance of the acquisition of a symbolic pattern—possibly mainly in verbal terms—in trial and error learning. Third, we are thus furnished with a basis for the interpretation of studies on the relationship between verbal and motor learning. [10 min.]

*Visual versus Auditory Methods of Teaching the Bi-Manual Production of Rhythmic Patterns.* HELEN F. SCHICK, Central Institute for the Deaf, St. Louis.

The problem of teaching the production of rhythmic patterns has led music teachers to develop two methods of instruction, namely: (1) Visual, in which rhythmic patterns are mathematically fitted, with knowledge of note values, time signature, etc., into a constant tempo; (2) Auditory and kinaesthetic, in which rhythmic patterns, auditorially presented, are reproduced by imitative action. Neither method has proved practical in music teaching.

Methods paralleling these were used for two groups of adult subjects in this investigation of the bi-manual production of rhythmic patterns. The apparatus consisted of: (1) a semi-soundproof room, containing a telegraph sounder that makes the clicks and a telegraph key for each hand; (2) a new type of interval timer which produces clicks at various rates and in various rhythmic patterns; (3) a polygraph, which records taps of the subject and clicks of the interval timer.

Results indicate that bi-manual rhythms at various tempos may be practiced with varying efficiency as is shown by: (1) an increase in accuracy of tapping when aided by clicks; (2) a measured increase

in the regularity of grouping; (3) an increase in the intensity of the accented versus the unaccented taps; (4) an increase in the perfection of simultaneity of the two hands, a decrease of precedence by the non-preferential hand.

The auditory method is superior to the visual as is shown by: (1) a more rapid adjustment time to a change of pattern; (2) greater accuracy in the production of the rhythmic patterns; (3) absence of the additional difficulties of reading and interpreting notation. [15 min.]

PROGRAM: MENTAL TESTS

SATURDAY, SEPTEMBER 10, 10:30 A.M.

AMPHITHEATER, STIMSON HALL

JOSEPH JASTROW, *Chairman*

*Comparison of Intelligence Test Scores Made by College Seniors with Those Made as Freshman.* L. D. HARTSON, Oberlin College.

Comparison reveals statistically reliable improvement in total scores in O.S.U. Psychological Examination, in spite of the fact that freshmen scores are higher in arithmetic and number series ( $N=207$ ). Seniors work with greater accuracy in all tests except arithmetic. Improvement appears in opposites, grammatical analogies, and reading comprehension, in all groups classified by major subject. Significant improvement in arithmetic was made only by majors in mathematics, who made the highest scores initially. Similarly the foreign language majors started and finished with the highest vocabulary scores. English majors, who began with the highest reading scores made less improvement than any group except Music and Fine Arts. Data suggest that students' "intelligence," still immature, is being fashioned diversely by the matter and technics of the various major fields of study. [10 min.]

*Mental Abilities of Adults Ranging in Age from Sixteen to Seventy.* HERBERT SORENSON, University of Minnesota.

The mental abilities of 641 adults are the subject of this report. In all, 5,500 adults attending university classes were tested by the Minnesota College Aptitude Test and the Minnesota Reading Examination Form A. The first mentioned test measures vocabulary ability, and the second test measures ability to comprehend the meanings of paragraphs.



The 641 subjects of this report were chosen from the 5,500 and arranged by age in five year groups according to years of schooling and occupational status. Thus two very important factors, formal education and occupational level, were controlled for every age.

The average scores on the vocabulary test with only one exception were greater for each successively older age group. The median score of the 50-59 year old adults was .26 of a standard deviation above the median score of the 20-29 year olds. Standard deviation in this case was calculated from the scores of the 5,500 adults.

The median scores on the paragraph-meaning test were different from the vocabulary test scores. The reading ability curve shows neither an upward nor downward trend with age.

Nearly all investigations of adult abilities show a deterioration of ability with age. This study, which controls two very important factors, years of formal schooling and occupational level, was made of adults who engage in formal study. With those controls and under such a circumstance, some abilities seem to increase with age.

Two important topics are discussed: (1) The differential effects on mental processes of increasing age, and (2) the influence of mental activity, use and disuse, on adult mental abilities. [15 min.]

*Comparative Motor Abilities of Athletes and Non-Athletes.* R. W. HUSBAND, University of Wisconsin.

What makes a good athlete? Training alone does not appear to be adequate to account for a high degree of athletic proficiency, since some individuals achieve with very little practice a higher level of skill than do others after years of effort. The question of the all-round athlete is also of interest; what sort of capacity does he possess which enables him with less practice than others to do well at several sports?

We studied a number of athletes from various teams, using the Seashore Motor Skills Unit as our means of measurement. Subjects were secured from the basketball, football, baseball, crew, gym, and track teams. Their scores are compared with those of a control group, an average college class. Special effort was made to secure test scores on men who had earned letters in more than one sport.

All groups of athletes exceeded the scores of the control group, although the differences were more pronounced in some tests than others. In general the superiority was greater in the complex tests, involving serial and pursuit functions, such as speed of tapping and speed of turning a crank drill. Furthermore, athletes improved much

more rapidly during the test period, although it was of comparatively short duration, than the control subjects.

The members of the gym team were superior over other athletes in all tests. It is noted that gymnastic activity involves a delicate control of all muscles of the body. Track men were the poorest of all groups of athletes. They had been selected since their skill lay chiefly in their legs, while the tests involved arm and hand activities. Basketball and baseball men were especially good in the pursuit rotor test, a function rather similar to that called for in their game. [15 min.]

#### PROGRAM: MEMORY

SATURDAY, SEPTEMBER 10, 1:30 P.M.

ROOM A, GOLDWIN SMITH HALL

ARNOLD GESELL, *Chairman*

*An Objective Study of Early Childhood Memory.* HAROLD E. BURTT, Ohio State University.

Twenty-line selections from Sophocles' "Oedipus Tyrannus" in the original Greek were used. Three such selections were read to the subject daily between the ages of fifteen and eighteen months. Three more were read from eighteen to twenty-one months, etc., until the age of three years. The entire matter was dropped until the age of eight and one-half years. Then one selection from each age level was learned by a modified prompting method. Three other similar selections that had not been presented in infancy were learned simultaneously.

The three new selections required on the average 435 repetitions before the subject could recite them without prompting, while the seven that had been presented in infancy required an average of 317. Using the *t*-function called for by small-sample theory, the chances are .98 that this difference between averages is real. None of the original selections required as many repetitions as the new. In general, those presented at a later period in infancy were relearned more readily. Nevertheless, the evidence seems clear that nonsense material presented to the present subject 90 times between the ages of fifteen and eighteen months left an impression that could be detected in a relearning experiment seven years later. [15 min.]

*An Investigation on the Extent of the Memory Factor.* ANNE ANASTASI, Columbia University.

In a previous study, the presence of a common factor through a series of tests of immediate rote memory for visually presented material was demonstrated. The purpose of the present study is to discover whether this memory factor also extends through other types of memory tests, namely, auditory logical recall and recognition, delayed recall, memory for movements, memory for tonal sequences, and incidental memory. These six tests were given to a group of 200 college girls, very homogeneous in respect of age, academic, racial, and social status. In addition, three other tests were given as reference values, namely, an analogies test and two of the memory tests used in the earlier study. Intercorrelations were computed and the results subjected to the tetrad difference analysis. [10 min.]

*Eye-Movements During Reading and Recall.* P. H. EWERT, University of Vermont.

Eye-movements were recorded by direct observation as well as photographically (photographic records were taken in the Yale Psychological Laboratory in collaboration with Dr. Richard Wendt) under the following conditions:

While memorizing poetry by reading it orally and by reading it silently;

While recalling poetry by reciting it orally, and by reciting it silently;

While memorizing poetry from dictation;

While recalling poetry orally after learning it by dictation;

While recalling poetry silently after learning it by dictation; and while unmotivated.

The following are the main conclusions of the investigation:

1. There are marked individual differences in frequency of eye-movements during the various conditions of the experiment. Individuals, however, vary but slightly in their own records.

2. There is an average reduction of horizontal eye-movements during ten repetitions of both oral and silent reading.

3. During the recall of a given selection of material previously read, the frequency of movements is approximately equal to that observed in the reading of such material. The frequency during recall is also found to be about four times that during non-activity. This indicates that eye-movements typical of reading tend to carry over to recall. It also furnishes a striking example of the presence of motor components in (vocal or sub-vocal) recall.

4. During the recall of a given selection of material not previously read but memorized by dictation, the frequency of eye-movements closely approximates that obtained in reading the same material. Under favorable conditions there thus appears to be a tendency for verbal recall to evoke eye-movements which closely resemble those present while reading the material. This is true whether the acquired material is visual or auditory.

We believe that our findings warrant the following general conclusion: *Eye-movements accompanying verbal recall are in themselves a part of the recall.* [15 min.]

*Retention After Intervals of Sleep and Waking.* EDWARD B. VAN ORMER, St. Joseph's College and Wagner College.

The object of this study was to obtain further information regarding the effect of sleep upon retention. It was proposed in particular to repeat Jenkins and Dallenbach's work, comparing the retention of nonsense syllables after 1, 2, 4, and 8 hours of waking and of sleep. Employing the method of savings, it was hoped to obtain results that would explain discrepancies between earlier investigations. Special care was employed in constructing the syllable lists; three lists were learned at one sitting; and tests of diurnal variation in learning performance were conducted. Two thoroughly practiced Ss subordinated all activity to the conduction of this experiment.

Retention was definitely better after 8 hours of sleep than after the same time interval of waking; there was a probably reliable difference in favor of sleep at the 4-hr. interval; a merely suggestive difference in favor of sleep at the 2-hr. interval; and no difference between sleep and waking at the 1-hr. interval. From the 1-hr. period on, the retention curves for sleep were practically horizontal lines.

The results of this and previous studies on sleep and retention have an important bearing on the much discussed subject of retroactive inhibition. These studies, combined with the work on retroactive inhibition, necessitate a revision of the law of disuse and a modification of the accepted theories regarding the nature of forgetting. In view of the fundamental similarity between the learning of nonsense syllables and other verbal material, the studies on sleep and retention seem to justify and rationally explain the study-habit, frequently recommended, of learning just before going to sleep. "Little is forgotten during sleep, and on waking, the learner may take up the task refreshed and with renewed vigor." [15 min.]



*Mental Set in Relation to Retroactive Inhibition.* OLIVE P. LESTER,  
University of Buffalo.

The present experimental project was undertaken to investigate the effect of set (established by written directions given to subjects at the time of the original learning) on the susceptibility of learned material to retroaction. The material used in both the original and interpolated learning consisted of standard lists of 12 three-letter nonsense syllables. Some 200 subjects participated in the experiment. The directions given to the several groups differed as to the amount of information given about the experiment: (1) expectation of a recall, (2) expectation of an interpolated list, (3) information as to the possible effects of an interpolated list, (4) statement to avoid the possible interference effects of an interpolated list. Results indicated no significant differences between conditions 1, 2, and 3 in regard to retention as measured by both the number of syllables recalled and the number of trials to relearn the original list. However, trends in the data seemed to point to increasing degrees of retention with increasing amounts of information given at the time of learning. Condition 4 appeared to be decidedly more favorable to retention than the other three conditions. All conditions differed significantly from the one in which no information was given, and in which an interpolated list of nonsense material was introduced, *i.e.*, the condition which demonstrated the retroactive effects unaffected by directions of any sort. [15 min.]

*The Effect of Punishment During Learning Upon Retention.*  
LELAND W. CRAFTS and RALPH W. GILBERT, New York  
University.

The aim of the experiment was to determine the effect of punishment for errors in learning a maze upon its retention. The subjects were 100 college students divided into two groups of 25 men and 25 women each. Both groups learned the McGeoch Medium Maze to the criterion of two of three successive trials without error. The experimental group received an electric shock, of an intensity adjusted to the sensitivity of the individual subject, whenever the stylus came in contact with the end of a cul-de-sac. After an interval of one week the maze was relearned to the same criterion as before, but without shock for either group. The results were: In learning the experimental group was superior according to the criteria of trials, cul-de-sac and retracing errors, and time. The differences were small, and greater for the female subjects, but were consistent throughout. In relearning there was no significant difference between

the groups in recall score on the first trial or in per cent saved. According, however, to the criterion of the total number of trials, errors and seconds required to relearn the male experimental group was slightly and the female markedly superior to the control. It is therefore concluded that punishment for errors was advantageous not only for the learning of the maze but also for its retention. In so far as punishment has an instructive value the results are in harmony with those of Koch and Waters in finding guidance of value for retention. In so far, however, as punishment is an incentive, both the problem and the results are unique and constitute a first experiment with human subjects concerning the effect of motivation during learning upon retention. [15 min.]

*The Permanence of Learning in General Psychology.* ALVIN C. EURICH, University of Minnesota.

When students who have taken Psychology 1 and 2 at the University of Minnesota are retested with the final examinations in these courses six and nine months after they have taken the work, the results indicate that after nine months they retain approximately 73 per cent of their knowledge at the close of the course; after six months, they retain approximately 90 per cent. This amount retained is considerably higher than reported in previous studies similarly analyzed. Furthermore, the application of a technic developed by Harris to show the correlation between a variable and the deviation of a dependent variable from the probable value reveals no tendency for the individual with the most information at the close of the course to retain relatively the most after a period of several months. However, the correlations between the scores on the final examinations and on the retests are relatively high. [10 min.]

PROGRAM: ANIMAL PSYCHOLOGY

SATURDAY, SEPTEMBER 10, 2:15 P.M.

ROOM C, GOLDWIN SMITH HALL

WALTER S. HUNTER, *Chairman*

*Direction Orientation and the Forward-Going Tendency in White Rat Locomotion.* A. G. BAYROFF, University of North Carolina.

Rats were expected to show a preference to enter a test alley that extended in the same direction as the original alley after they were no longer fed in the latter. Instead, four experiments demonstrated

decisively a preference for an alley at right angles to the original. However, a fifth experiment revealed a marked preference for a test alley consonant in direction with the original. In all five cases the preferred test alley lay in a direction straight ahead from the exit from the original alley; and hence it is concluded that the forward-going tendency dominated the behavior. [10 min.]

*A Study of Orientation in the Rat.* NORMAN R. F. MAIER, University of Michigan.

In the present study the following question was raised: If a rat runs from point A to point B, has it acquired knowledge which makes it capable of using the relationship B-A as well as A-B when the need arises?

This was tested under the following conditions: (1) the rat ran on an elevated pathway from one table to another in one direction and was tested in its ability to use the pathway in the opposite direction; (2) the first condition was repeated with the addition of having the pathway made part of a triangular pattern, the other sides of which were explored in both directions; (3) the second condition was repeated except for the difference of having the pathway traversed in both directions; and (4) the second condition was repeated with the modification of having the pathway traversed in neither direction. Thus in the latter condition only the remainder of the pattern was explored.

The results show that only under condition 2 and under the control condition 3 were the rats capable of using the pathway in question. This means that the rat can only apply its knowledge of the relationship B-A when (1) B-A has been experienced directly; and (2) A-B has been experienced as part of a larger pattern the remaining relationships of which have been experienced in both directions. Neither the experience of the remaining relationships, nor the experience of the relationship A-B alone, however, are sufficient to enable the rat to use the relationship B-A.

The results indicate that although points in space are visited in succession by the rat, they are nevertheless perceived or experienced by it as a simultaneous pattern during the process of becoming familiar with a given region. [15 min.]

*The Conflict of Two Behavioral Tendencies in the White Rat.* WILLIAM H. STAVSKY, Harvard University.

When white adult rats are fed at the top center of an inclined plane they utilize two modes of orientation in proceeding upward.

The trails are either perpendicular to the base or else form an acute angle with the base; and their relative prepotencies are determined by the animals' state of hunger.

Rats were taught to proceed perpendicularly upward when the slope was 50 degrees. The inclination was increased to 65 degrees. At this inclination the rats shifted from the perpendicular to the non-perpendicular mode of orientation. This sudden change in the mode of orientation occurred at several inclinations, the perpendicular response being supplanted by the geotropic orientation. These results are in direct opposition to the *Struktur-Funktion* phenomenon and suggest that a new explanation is necessary to account for the behavior of an animal in the discrimination of relative intensities of stimulation. [10 min.]

*A Comparison of White Rats and Raccoons with Respect to Their Visual Discrimination of Certain Geometrical Figures.* PAUL E. FIELDS, Stanford University.

The first year's work with four raccoons on several different types of apparatus gave only negative results so far as visual figure discrimination was concerned. A serial five unit discrimination apparatus was then built, but it did not prove satisfactory until certain changes, involving the speed with which the animals were allowed to secure food after a correct choice had been made. After that, figure discriminations were obtained in less time than the earlier (and supposedly easier) light discrimination.

There was considerable variation in the way the individual raccoons responded to the experimental situations, but all of them perfected the initial discrimination between an equilateral triangle, apex up, and a circle of equal area. This is the first time that positive visual figure discrimination has been obtained with raccoons.

One raccoon, with no further training, discriminated triangles in new combinations with 90 per cent accuracy, equal to the rats' accuracy after they had been given more than 1,000 additional trials on the same patterns. This animal was evidently responding to "triangularity" or "form" in the highest sense of the word.

An analysis of the raccoons' responses to various patterns showed the following types (highest type is first): (a) A response to equilateral and right angle triangles regardless of their size and position, or the shape of the figures exposed with them. (b) A response to various positions of these triangles when exposed with a circle. (c) A response to a particular position of the equilateral triangle when exposed with non-triangular figures. [15 min.]



*The Rate of Establishment of a Discrimination.* B. F. SKINNER,  
Harvard University.

A method utilizing the rate at which a reflex is elicited under constant stimulation as a measure of its strength during the processes of conditioning and extinction is used in investigating the establishment of a discrimination. An arbitrary reflex, the pressing downward of a light lever by a rat, is originally conditioned when the response is followed immediately by the delivery of food into a convenient tray and is extinguished when the response is not so followed. In the present case the reflex is alternately reconditioned and extinguished by allowing the response to be followed by the delivery of food only at set intervals. The separate curves for extinction then fuse, and the reflex assumes a constant strength, which is maintained without significant modification for as many as thirty experimental hours. The value of the strength assumed is a function of the interval at which the reflex is reconditioned. At the higher rates of elicitation, *i.e.*, with shorter intervals, the delivery of the food eventually comes to inhibit the reflex for part of the succeeding interval, but a compensatory effect leaves the total number of responses per interval unchanged. In establishing a discrimination an extra stimulus is introduced at each reconditioning but is omitted during the intervening periods of extinction. The response to the lever-plus-extra-stimulus then remains fully conditioned, while the response to the lever alone is extinguished. The curve given experimentally for this change has the properties of the normal curve for extinction, examples of which are given. A quantitative difference probably measures the overlap of the two sets of stimuli. The concepts of conditioning and extinction thus afford an adequate description of a discrimination of this type. [15 min.]

NOTE ON THE REVIEWER OF DR. HOLT'S BOOK

In the October, 1932, *PSYCHOLOGICAL BULLETIN* there appeared, on pages 586 to 600, a review of *Animal Drive and the Learning Process* by Edwin B. Holt. Due to an editorial error this review was unsigned. It should have been signed as follows:

ROSWELL P. ANGIER

*Yale University*

Will subscribers and librarians kindly make this correction in their copies.

THE EDITOR

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